The Garden Journal

of The New York Botanical Garden

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The New York Botanical Garden is always an interesting and delightful place to visit. On the grounds, during July and August, may be seen plantings of annuals and perennials and the water-lilies, hardy and tropical, are lovely features of the pools adjacent to the Conservatory.

Within the Museum Building the fascinating exhibition, "The Influence of Plant Forms on Design," continues throughout the summer months.

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THE GARDEN JOURNAL
of The New York Botanical Garden

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July-August 1952

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AMONG OUR CONTRIBUTORS

DR. RALPH E. ENGEL is qualified to tell home owners what they should do to keep their lawns verdant during the warm days of summer, for he is Assistant Research Specialist in turf management at the New Jersey Agricultural Experiment Station, Rutgers University. . . . ROSELLA F. (MRS. A. M.) MATHIEU grows herbs in variety on her "Fragrant Herb Farm" at Cincinnati, Ohio; she also writes about them and is author of THE HERB GROWERS' COMPLETE GUIDE, which was recently published in a revised edition. . . . FRED M. PACKARD, as Executive Secretary of the National Parks Association, has had ample opportunity to become well versed in the problems and personalities of our national parks. . . . DR. RICHARD A. HOWARD is Assistant Professor of Botany at Harvard University. . . . DR. ORA SMITH is Professor of Vegetable Crops at Cornell University, where he has taught and conducted research on the potato for the past twenty-two years. His study of the potato has taken him to all states of the United States and to twenty-eight countries of Europe, Central and South America. He has over one hundred publications dealing with cultural storage and processing phases of the potato. . . . T. H. EVERETT is Horticulturist of The New York Botanical Garden. . . . DR. WILLIAM J. ROBBINS is Director of The New York Botanical Garden. . . . DR. HENRY A. GLEASON is Curator Emeritus of The New York Botanical Garden. . . . EDWIN DE T. BECHTEL is a busy New York lawyer who has several absorbing hobbies. One of his hobbies is a rose garden of over five hundred plants and one hundred fifty varieties at Bedford Four Corners, Mt. Kisco, N. Y. Mr. Bechtel is a member of the Board of Managers of The New York Botanical Garden, and his brochure, "Our Rose Varieties and Their Malmaison Heritage," was published in 1949 by The New York Botanical Garden. Mr. Bechtel has also written articles on roses for horticultural publications, among which are "Horticulture" and THE AMERICAN ROSE ANNUAL. . . . EDITH F. JOHNSTON is familiar to nature lovers as author and artist. In Florida the past four years she studied tropical and subtropical plants and made more than one hundred paintings and sketches. Mrs. Johnston made a special study of the cycads and their amazing manner of reproduction and has written a comprehensive account with illustrations from the living plants. She also occupied herself with the banana family, too, perching for hours atop a ten-foot ladder while she sketched blossoms, buds and immature fruit and watched the wasps and humming birds that visit them. She is now living in the Connecticut hills near Roxbury among the northern flora of her first book, A BOOK OF WILD FLOWERS. Her latest work from Macmillan (250 illustrations) is in production. . . . NOREEN S. (MRS. OLIVER B.) CAPEN is a past president of the Herb Society of America.

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A note about our Cover

In 1790 Pierre Lorillard bought a wooden grist mill and dam on the Bronx River, in what is now The New York Botanical Garden, there to produce snuff and tobacco products. The mill was one of the earliest and best water power developments in America, the Bronx River tumbling through the gorge furnished a never-failing swift flow of water. By 1840 the production of snuff and tobacco outgrew the wooden mill and it was replaced with a granite structure, known as the Bronx River Mill. This century-old mill still stands.

Now, the Bronx River Mill is being renovated for the use and enjoyment of the present and future generations. No longer will it have the sweet aroma of snuff, but the appetizing odors of good cooking, for it will be a tea house. The old mill will be transformed from a busy place of manufacture to a restful meeting place where civic organizations, garden clubs and casual visitors will enjoy the pleasures of its new appointments.

KEEPING IT GREEN

By **Ralph E. Engel**

Summer weather provides the real test for the lawn. It is at this season that heat, drought, insects, and weeds inflict the most damage to the lawn. Unfortunately, these difficulties occur during the summer when the lawn is most useful and is most desirable for beautifying the landscape.

It is unfortunate that our best lawn grasses do not perform as well in hot weather as they do in the cool, moist weather of spring and fall. Thus, the lawn owner should be somewhat philosophical about the lawn and should expect a certain amount of yellowing or browning of the grasses during the heat of summer. The typical lawn grasses can discolor considerably and still regain better color as soon as favorable weather returns. Although discoloration may be temporary, it is undesirable. There are a number of things that will reduce lawn discoloration in summer and also will serve to reduce loss of turf under more severe conditions.

Water With Care

Most lawns will survive the average summer without water. During the 1949 season, many lawns in the New Jersey area survived the hot June weather for forty days without rainfall. This should assure us that we need not start watering at the first sign of grass discoloration. Actually, watering the lawn should be avoided as much as possible, because excess water encourages disease and weeds.

Poor color is not a sure sign that water is needed. Other factors, such as disease, insects, and low fertility may be responsible. If extended dry periods do occur during the summer, water can be beneficial if it is applied correctly at the proper time. If water is needed the soil will be dry to a depth of five or six inches, where the roots are most abundant. Apply water slowly until the soil is moistened to a depth of four or five inches, and then discontinue watering. Excessive watering or flooding excludes the air from the soil, and makes the soil less porous and productive. In dry weather, a good watering every seven to ten days should sustain life. Watch terraces, areas next to trees, sandy soil areas, and slopes that face south, because these are the first to suffer from a lack of water.

Water is a basic need to grass, but use it only to keep the grass alive. Watering has been used to keep full green color in lawns whenever the grass shows a tendency to fade with heat. This is a dangerous practice, as it keeps the grass soft and susceptible to injury. A lawn cannot be maintained in a healthy state, if it is overwatered.

Higher Cutting Beneficial

The high cut lawn has a better chance of maintaining its color in summer and surviving heat and drought. The typical lawn composed of Kentucky bluegrass and fescue should not be cut closer than one and a half inches at any time. A cut of two and a half inches may be desirable in severe summer weather.

A higher cut leaves a better grass cover on the soil that reduces water loss and keeps the soil temperature lower. Also higher cutting strengthens the grass plant and leaves less room for weeds to grow.

The higher cut lawn may not be quite as attractive in the early summer when the grasses are still growing satisfactorily. However, if it enables the turf grasses to survive and keeps weeds in check, the high cut lawn will look better at the end of the summer. The closely clipped lawn may be injured by drought and crabgrass and require expensive reseeding.

Control Summer Weeds

Crabgrass is the worst of the summer weeds. It is an annual that starts from seed each spring or summer. Crabgrass may become so dense as to smother the permanent grasses and it is very unsightly when frost turns it brown in September. It prefers moist-

ure, sunlight (cannot tolerate shade), fertilization in warm weather, and a thin turf cover. Frequently, watering can encourage a few scattered crabgrass plants to spread rapidly and cover large areas of the lawn.

A single crabgrass plant can produce a large amount of seed and every effort should be used to prevent seed setting. Where the lawn is small, or where only scattered plants exist, hand-weeding is still one of the simplest and surest methods of preventing crabgrass from setting seed. Lifting the seedheads before mowing, and removing the clippings will reduce the seed set. In addition, this method will prevent the creeping runners from spreading so rapidly. Lowering the height of cut will not prevent seed formation as crabgrass can produce seed abundantly when cut as low as three-sixteenths of an inch.

Chemical Crabgrass Control

Chemicals such as the phenyl mercury compounds or potassium cyanate may be useful in combating crabgrass. The mercury compounds are poisonous and costly but are more selective. The potassium cyanate preparations are non-poisonous and best suited for the Kentucky bluegrass type of lawn.

The greatest problem concerned with the use of chemicals for controlling crabgrass is that of proper application at the correct time of the season. Overdosage may kill the grass, while underdosage may give no results. The instructions on the commercial container usually give a range in the rate of application. Different growing conditions require that the rate be adjusted, and the user may be required to use the maximum or minimum rate of application as trial will indicate. The correct amount of chemical should be distributed uniformly over the crabgrass-infested area. Spot treatment rarely succeeds.

Chemical crabgrass control is a method that can be recommended only where instructions will be followed carefully. Incorrect application can destroy the turf grasses. Trial applications to a small corner of the lawn should be used to make certain that the discoloration is tolerable. The best season for treatment of most lawns is in August, just prior to the rapid spread of the crabgrass. Treatments made in cool, moist weather are more successful than those made in hot, dry weather.

Chemicals can be very helpful in controlling crabgrass, or they can be most disappointing and expensive if improperly used. In spite of their potential value in combating crabgrass, they are not a "cure-all." In no case should high cut and regular fertilization be overlooked on lawns where crabgrass is a problem. These important maintenance factors conducted for several years should encourage a tall, dense turf cover that will prevent crabgrass from becoming serious.

Fertilize During September

Fertilize during September and early spring when the lawn grasses make best use of the plant food. Feeding the lawn during late spring, July, or August should be avoided, as it will stimulate the weeds more than the turf grasses and will make the grass more susceptible to disease. The extra color provided by summer fertilization is not worth the risk of damaging the lawn.

Guard Against Japanese Beetles

Japanese beetle grubs may do serious damage to lawns in late summer. If a number of the beetles has been observed swarming on the lawn, it is likely that a large population of grubs may develop and injure the lawn severely during August and September. If the lawn has not been grub-proofed, an application of about five pounds of ten per cent DDT or five pounds of a five per cent chlordan dust per one thousand square feet will give good control. The DDT treatment will give control for a longer period of time, while the chlordan kills more rapidly.

Start New Seedlings in August

Late August is the best season of the year for starting a new lawn. Delay of planting after this date, or until spring, will leave the grass immature, with less chance of surviving next summer. Start preparation of the seedbed at the earliest opportunity. Provide a good contour and good drainage. Use plenty of lime and fertilizer. Most soils in the humid regions will benefit from application of ground limestone and a complete fertilizer that is high in phosphorus. These materials should be mixed with the soil before seeding. Select the seed mixture with care. Kentucky bluegrass, Chewing's fescue or other improved red fescues, and Colonial bentgrass are still the basic lawn grasses for the moist-temperate regions. Avoid grass seed mixtures that are composed largely of ryegrasses, redtop, and timothy. Spread three to four pounds per one thousand square feet of a good lawn seed mixture, and lightly rake it into the soil.

New Grasses

A new grass that will provide a cure to our lawn problems and will give luxuriant summer turf would be most welcome to the home lawn. Experimental grasses such as Merion (B27) bluegrass, Zoysia, and U3 Bermuda have been suggested for lawn use in the cool-humid areas. Unfortunately, none of these promises to end lawn problems. Furthermore, Merion (B27) bluegrass is the only one of the three that is available in appreciable quantities. The seed supply of this grass is small and the seed is high-priced. Merion (B27) is a good strain of Kentucky bluegrass, but it is no substitute for good management. Like other Kentucky bluegrasses, it starts slowly. When quantities of Merion (B27) bluegrass become available at a lower price, it should become a popular and useful grass. However, it cannot be expected to eliminate the problem of a good lawn.

The Zoysia grasses and U3 Bermuda have many excellent qualities, but they have several undesirable features that leave them with little value, unless further research opens new possibilities. Both grasses are brown in cold weather for approximately six months of the year. Until an easy method of overcoming this situation is developed, it is unlikely that Zoysia or U3 Bermuda will be desirable for the typical lawn in the cool-humid sections. In addition, Zoysia is very slow in becoming established, and U3 Bermuda can be a serious weed pest. While these grasses offer good summer turf, they give rise to new and different problems. Occasionally, small quantities of these grasses can be obtained, but the home lawn owner should leave them to the research worker for further experimentation.

Enjoy the Lawn in Summer

Since most of the lawn work such as mowing, fertilization, liming, and reseeding are largely cool season

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THE PRACTICAL HERB GARDEN

For Pleasure and Use

By Rosella F. Mathieu

When you plant an herb garden, you plant a garden to delight the five senses. All sorts of delicious, aromatic fragrances tantalize the nose, cool colors please the sight, the buzz and drone of bees resound in the ears. The varied leaf textures, with the surprising release of scents, appeal to the touch. And lastly, the unending richness of flavorings gives year-round pleasure to the palate.

There are many reasons for planting an herb garden. For years I dreamed of the luxury of harvesting my own lavender, and after reading Louise Beebe Wilder's THE FRAGRANT PATH, I could hardly contain my impatience for a plot of my own. So when space became available, you can imagine the thrill I experienced in setting out lavender, lemon-verbena and rose-geranium. These marked the beginning of my adventure with herbs. Herbs used for cooking were not familiar to me, so marjoram and thyme were planted not to grace the table, but as ingredients for the tiny sweet bags I made for gifts. After two years of experimenting with herbs spotted through the border and in rows in the field, I was ready for my first bona fide "herb garden." And by that time, I had come to appreciate fully culinary herbs and they received their allotted space.

Today every plant in my garden is doubly useful, for it not only contributes its share to the charm of the garden plan, but is included for its employment in cooking, for sweet bags or sachets, for dry or moist potpourri, and for flower arrangements. Sometimes a plant has many uses. Basil, for example, is extensively used in cooking, the young leaves are added to sachets and potpourri, and sprays to flower arrangements. My choice of plants is purely personal — after you have grown herbs, your selection may not include my favorites. The ones suggested here grow easily in southern Ohio and, for the most part, adapt themselves to the entire country.

The choice of herbs is legion — and since by definition they include any plant used for fragrance, seasoning or medicine, you will realize this covers a large part of the plant kingdom! The first year, perhaps it would be advisable to confine yourself to the easier herbs. However, if you know your way around a garden, you might try one or two which are considered more difficult, as, for instance, angelica and chervil. You'll lose only a plant or two and think of the fun you'll have.

Actually, herbs are grateful plants, responding to a minimum of attention. What is necessary (as with all growing things) is to check their requirements — whether they need sun or shade, alkaline or acid soil, whether good drainage is a *must*. For the most part, herbs enjoy full sun for maximum development of the oils which

The herb garden of Mrs. Herman Husch, St. Louis, Mo.; landscape architect, Edith S. Mason.

COMMON NAME	BOTANICAL NAME	KIND	HEIGHT	CULTURAL NOTES	USAGE
Angelica	*Angelica Archangelica*	Hardy biennial	about 6′	Propagated from fresh seed, root division, offshoots	Stems eaten raw, leaves in salad, candied stems decorate cakes
Anise	*Pimpinella Anisum*	Annual	1′ to 2′	Seed	Fresh leaves in salads, seeds in cakes, cookies, candy, baked apples
Lemon Balm	*Melissa officinalis*	Hardy perennial	1½′ to 2′	Seed, root division, cuttings, self sows	Leaves in tea, young leaves in dry potpourri and sweet bags
Sweet Basil	*Ocimum Basilicum*	Annual	to 2′	Seed. Harvest before first frost	All tomato dishes. Green salads, egg dishes, canned vegetable soups, roast or stews. Delicious vinegar
Purple Basil	*O. Basilicum purpureum*				
Lettuce leaf Basil	*O. crispum*				
Dwarf Purple Basil			to-10″		
Burnet	*Sanguisorba minor*	Hardy perennial	1′ to 1½′	Seed root division, self sows	Ferny leaves add cucumber flavor to salads, iced drinks, and with orange rind makes a delicate vinegar for fruit dressings
Caraway	*Carum Carvi*	Annual or biennial	2′	Seed, self sows. Light soil	Flavors rye bread, cakes and cookies, cottage cheese
Chervil	*Anthriscus Cerefolium*	Annual	1½′ to 2′	Seed, where it is to grow, self sows. Part shade	Anise-like flavor used like parsley with fish, salads, soups, chicken. Best used fresh
Chives	*Allium Schoenoprasum*	Hardy perennial	1′ to 1½′	Seed, division of bulblets	Cottage cheese, omelettes, green salad, sour cream dressings. Attractive garnish
Dill	*Anethum graveolens*	Annual or biennial	3′	Seed, where it is to grow	For dill pickles, vegetable soup, fish sauces, fresh leaves in salad and mashed potatoes
Fennel	*Foeniculum vulgare*	Perennial but grown as an annual	4′ to 5′	Seed, where it is to grow. Rich, dry soil	Seasoning with fish and fish sauces, soups, salads, cottage cheese, sauerkraut
Garlic	*Allium sativum*	Perennial	to 2′	Bulblets set out in spring or fall	Rub on steaks or chops, roast chicken. Flavors vinegar or oil for dressing
Hyssop	*Hyssopus officinalis*	Hardy perennial	1′ to 1½′	Seed, cuttings, root division. Easy from seed, makes an excellent inexpensive low hedge or edging for bed of taller herbs	Tips, sparingly in fresh salads, mixed herb vinegar

NOTE — Height varies, depending on climate, soil and other conditions.

supply scent and flavor, though many may be grown in partial shade. Most herbs require moderately good alkaline soil, such as is suitable for vegetables, and good drainage. But plants like lavender and rosemary demand highly limed soils and especially resent wet feet. Angelica, the mints and burnet, on the other hand, will tolerate shade; the first two enjoy root moisture and burnet tolerates it.

For your initial venture you may wish to buy many of your plants, although growing them from seed is the only way you can really learn their vagaries. Watching the first tiny shoots and then the true leaves develop on the seedlings is a real thrill. Tarragon plants may be purchased, since they are not propagated from seed; the pelargoniums, lavender, rosemary, pineapple-sage, and lemon-verbena are so slow, that it is best to start with plants.

If there is not enough room for a separate herb garden, the plants may be placed in the perennial border, in the rock garden, or in rows in the vegetable plot. But for real satisfaction, an enclosed herb garden, with neat paths and edgings, will amply repay the time and labor involved. If it is near the kitchen door, so much the better — this will expedite forays when the spaghetti needs a few sprigs of basil and juleps the indispensable spearmint.

A simple garden is rectangular in shape with beds made by intersecting paths. Another easily laid-out plot is a perfect circle, with the paths making pie-shaped beds; or the central point of interest may be a wagon wheel, the beds divided by the paths running concentric fashion. A sun dial, bird bath or garden statuary may be a focal point, with the ground at the base covered with creeping thyme.

A strawberry barrel, the pockets filled with either strawberries or herbs, also provides an interesting accent or focal point. The "Pyramid Garden," an idea recently introduced for a strawberry garden, might be useful as a central bed. Made of four bands of aluminum alloy, the bottom diameter is six feet. The bands are progressively smaller, the one on the ground being filled with good soil, the next one placed on it, and the process repeated till they are all filled. If your space is limited to a few feet, a "Pyramid Garden" placed in a sunny spot and

COMMON NAME	BOTANICAL NAME	KIND	HEIGHT	CULTURAL NOTES	USAGE
Lovage	*Levisticum officinale*	Hardy perennial	6′ to 7′	Seed, sown in fall after harvesting, root division. Sun or part shade, rich moist soil	Fresh leaves in soups, stews, salads
Sweet Marjoram	*Majorana hortensis*	Tender perennial	1′ to 2′	Seed or cuttings. Treat as an annual	All great favorites in the kitchen
Wild Marjoram	*Origanum vulgare*	Hardy perennial	to 2½′		
Oregano	*var. of O. vulgare*				Tastes like a mixture of marjoram and thyme
Parsley	*Petroselinum crispum*	Biennial	1′ or more	Seed, slow germinating (since "it goes to the devil nine times and back"). Soak in warm water over night	Garnish and flavoring for soups, stews, omelettes, creamed vegetables, salads. High in Vitamin C
Rosemary	*Rosmarinus officinalis*	Tender subshrub	2′ or more	Seed slow, layering, root cuttings. Best buy plants. Sometimes carries over winter in vicinity of Cincinnati, but to be sure of it, plant in pot and bring indoors	Seasons creamed soups, salmon soufflé, stuffings for fish and fruit cup. Great with lamb, veal, beef, ham dishes, duck and rabbit
Sage	*Salvia officinalis*	Hardy subshrub	2′	Easily from seed, root division, layering, cuttings. Long lived, with spread of 2′ or more	Flavors cream cheese, pork, veal, duckling, poultry dressing, mutton. Use sparingly
Summer Savory	*Satureja hortensis*	Annual	1′ to 1½′	Seed	Both used in meats, salad, sausage and poultry stuffing, vegetables, especially string beans. Summer savory more delicate in flavor
Winter Savory	*S. montana*	Hardy perennial	12″ to 15″	Sprawling	
Spearmint	*Mentha spicata*	Perennial	to 2′	Seed, but more easily from root division and cuttings. Tolerates part shade	Known for mint sauce with lamb, mint juleps, chewing gum and jelly. Delicious in iced summer drinks. Chopped over peas, new potatoes
Tarragon	*Artemisia Dracunculus*	Perennial	2′	Propagate only from cuttings or root division in early spring. Dislikes hot weather, grow in part shade in moderately rich sandy soil	Generally combined with chervil as a flavoring for salads and omelettes
Thyme	*Thymus vulgaris*	Hardy perennial	8″ to 1′	Division or seed. Winter heaving its greatest enemy. Full sun, sandy soil, much lime	Herb to use in all recipes, unless otherwise stated

NOTE — Height varies, depending on climate, soil and other conditions.

provided with good drainage may be the answer to your problem.

There are many suggestions for the garden enclosure — a low brick wall, a picket fence, a fence of natural wood. All are very attractive, but somewhat expensive, and it is better not to go to too much expense the first year, because, as you work with the plants, your ideas may change as to what you consider the ideal garden. I find a hedge of Amur privet *(Ligustrum amurense)* hardy, inexpensive and easy to maintain; it is allowed to bloom and then is cut back to about four feet. Box is an ideal hedge where it is hardy, but its cost is relatively high. Hyssop, on the other hand, comes easily from seed, is hardy, and if the seed heads are kept cut, its blue, white or pink blooms will appear all summer. Germander *(Teucrium chamaedrys)* makes a glossier hedge, with rosy purple flowers in late summer, but although it stays green far longer than hyssop, it is not as reliably hardy.

Hyssop and germander may also be used as edgings around the herb beds, both being very neat when kept trimmed to about eight inches. But I prefer edgings which have culinary use. For example, large quantities of thyme and marjoram are used in dried mixtures and for vinegar, so two of my beds are hedged with about fifty seedling plants each of these herbs. Burnet, also used for vinegar, proves a most attractive, almost evergreen edge. It comes easily from seed, tolerates shade and a wide variety of soils.

Parsley, chives, dwarf green and dwarf purple basil make attractive edgings, but best of all is the alpine strawberry, Baron Solemacher. There is a red and white-fruited form; the white is my preference because of its almost confection-like flavor. This hardy perennial grows easily from seed, but must be sown indoors by late February if plants are expected to bear the first year. It self-sows quite freely.

Harvesting the plants is an easy, pleasant chore, made memorable by the scents released when working with them. It is recommended that leaf herbs be harvested just before they come to bloom for maximum flavor. However, since you will not be growing herbs commercially, the difference in flavor isn't that important; and if the plants are allowed to bloom, the bees will enjoy them. Seed herbs, such as dill, fennel and anise, must be

watched and the seed heads cut as they begin to turn brown. They will finish maturing as they dry.

A light airy garage or attic is a good place to dry herbs, with the stalks placed on clean newspapers or, better still, on wire screens, with cheesecloth or thin muslin laid over them for the finer leaves and seed heads. Tied bunches of herbs hung from the rafters are picturesque, reminding one of olden times, but they take much longer to dry. During damp weather it might be best to finish them in a low oven.

Aside from parsley, sage, garlic, chives, and mint which are so universally well known, the four most useful seasoning plants, in my opinion, are basil, marjoram, oregano and thyme. Basil is number one in spaghetti and other Italian dishes, in a roast of beef, tomato juice and tomato dishes, minced into a green salad, to pep up left-overs. Of the six or eight varieties I have grown, I prefer the purple, which grows up to two feet. Its clove-like flavor is superior, its color lovely in the garden and flower arrangements. However, for your first attempt, better try the sweet as it germinates more easily. The purple needs bottom heat for maximum germination.

Marjoram has an affinity for chicken dishes, especially potpie; seasons veal and pork and stews of all kinds; and, in combination with other herbs, is used on broiled and baked fish. It gives quite a dash to spinach. Thyme adds an astringent quality to a combination of basil and marjoram for flavoring a roast, stew or chicken dressing. Oregano is another popular seasoning in Italian dishes, one of my favorites being my version of "pizza." This makes superb canapes or, on English muffins or sandwich bread, a filling, tasty open sandwich. Use crackers or tiny squares or circles of bread; almost cover with a sliver of sharp cheese; place on this a slice of tomato and bits of flat anchovy; sprinkle with minced garlic and oregano and a few drops of olive oil; broil until cheese is melted.

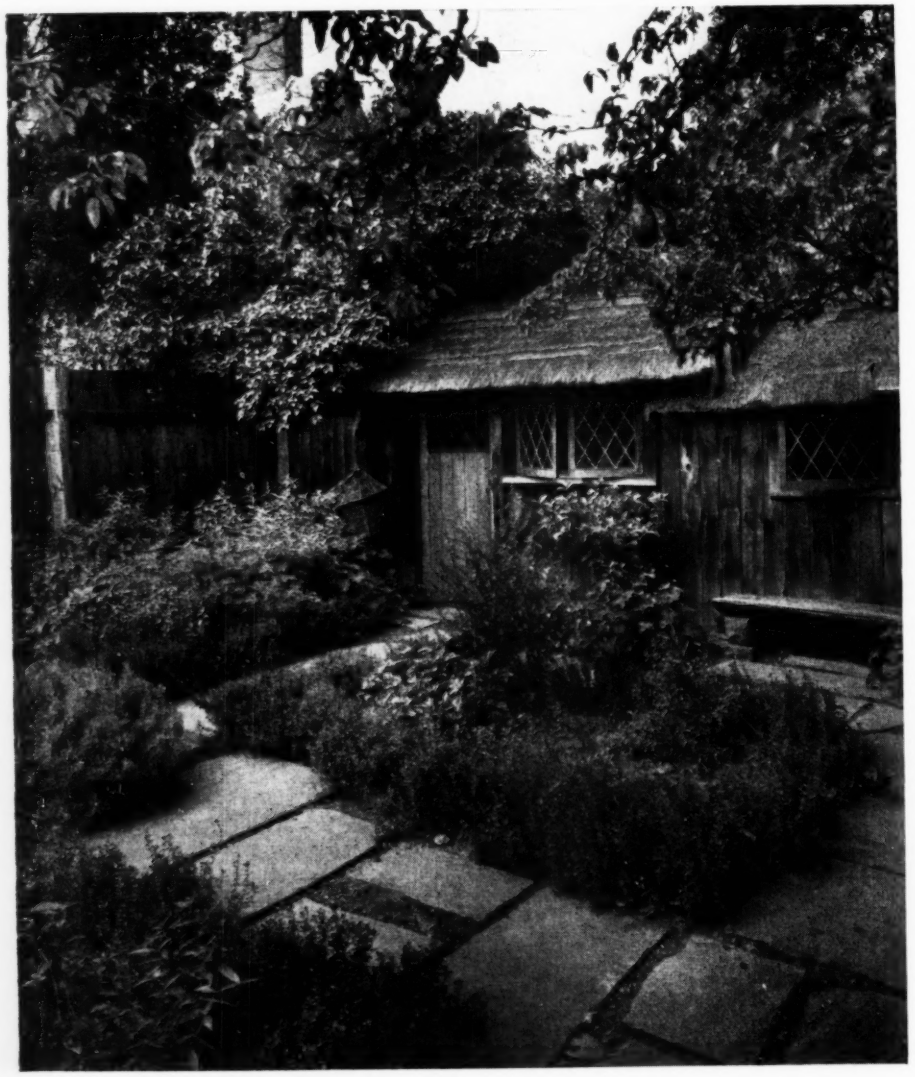
Tarragon is an important part of the culinary picture, though my family does not like it as much as the other herbs. Its sharp licorise-anise flavor seasons chicken estragon, combines with other herbs to flavor turtle soup, broiled fish, and adds its quota of zest to the finely-minced tips of chives, burnet and wild marjoram in the first spring salad. It is most widely known in tarragon vinegar.

The savories are favored seasonings, summer savory for split pea soup and string beans, and winter savory for dried herb mixtures. Lovage also contributes its pungent celery-like flavor to many combinations. One which I find very useful is as follows: two tablespoons each dried winter savory, thyme, marjoram, basil, lemon peel, lovage, parsley and one large bay leaf; put through coffee grinder and place in closed jar. A few pinches of this mixed seasoning sprinkled into soups or gravies in the last forty-five minutes of cooking, adds surprising zest to the finished dish.

Equally important plants in my "nose garden" are those grown for the dry open-bowl potpourri and the traditional (literally "rotten jar") moist variety, which is not attractive to look at or handle, but whose scents defy description.

To hold the dry potpourri, choose your choicest bowl of china, glass, pottery, or wood. This potpourri is a crisp, dry affair, pleasant to handle. When you wish to release the scents, pass your hand through the mixture, slightly crushing the dried materials. Include the dried young tips of southernwood *(Artemisia abrotanum)*, santolina or lavender-cotton *(Santolina chamaecyparissus)*, and lemon-balm *(Melissa officinalis)*. Leaves of sweet marjoram *(Majorana hortensis)*, costmary *(Chrysanthemum balsamita)*, sweet woodruff *(Asperula odorata)*,

(Continued on page 116)



The herb garden of Mrs. Paul Moore at Hollow Hill Farm, Convent, N. J.

The Past Decade in
OUR NATIONAL PARKS

By **Fred M. Packard**

AMERICA'S superb system of national parks and monuments represents the finest natural treasures our nation possesses. It is a heritage that will enable future generations to appreciate the character of the land their forefathers settled and to understand, in an increasingly urbanized environment, the deepest meaning of the term "recreation," a refreshment of the spirit in association with nature.

The national park concept was born in 1871, when the public-spirited discoverers of Yellowstone agreed that such marvels should be preserved for the benefit of all of the people rather than exploited by the few. They induced Congress to reserve more than two million acres as Yellowstone Park. Gradually other extraordinary natural spectacles were designated as national parks—Yosemite and Sequoia in 1890, Mount Rainier in 1899, Crater Lake in 1902—until today there are twenty-eight national parks and eighty-five national monuments in the system, as well as many national historical parks, parkways, and similar areas among the one hundred eighty administered by the National Park Service. They have been carefully selected, for to qualify for membership in the system the site must have national significance and conform to the highest standards of excellence. The total acreage of the system is not large, a little more than 24,000,000 acres, less than one per cent of the nation's land and water area; but it is the superlative of the whole.

The retirement of Newton B. Drury as Director of the National Park Service and his subsequent appointment as Chief of the Division of Beaches and Parks of California, affords appropriate opportunity to appraise the development of the national park concept during the past ten years and the defense that has been given the system under wartime conditions and the period of readjustment that followed.

As the executive officer of the California State Park Commission, Mr. Drury had achieved a national reputation as the driving force behind the Save-the-Redwoods League's inspiring campaigns that brought grove after grove of Coastal Redwoods into California's state park system. The brilliance of his writings and his sound practical idealism made him the ideal choice for the position of Director of the National Park Service. He assumed his duties in 1940, as the clouds of war were rising.

Quick to realize that the demands of a military economy would have a severe impact on the national parks. he laid the groundwork for the successful policies that enabled these reservations to contribute to the war effort without being exploited to their ruin under the excuse of defense necessity. Yosemite, Grand Canyon, Mount McKinley, and Hawaii, among others, became havens where battle-worn veterans could rest and recuperate amid serene hills and verdant valleys. The slopes of Mount Rainier were practice grounds for ski troops; and where it could be provided without injury to the landscape, other training was permitted. But when it was proposed to log off the forests of the new Olympic National Park to provide for airplane construction materials that could be obtained elsewhere, Mr. Drury fought valiantly to prevent such desecration, realizing such a step might start a trend.

At the same time he worked quietly but endlessly to develop cordial relations between his agency and other bureaus. The rather hostile rivalry that had long existed between the Park Service and the U. S. Forest Service melted before his persuasive tact, so that today the phrase "brother services" has come to have real meaning. Relations with the Corps of Army Engineers improved, and he worked, although with less success, to build understanding of the national park point of view on the part of the Bureau of Reclamation. The morale of the

Newton B. Drury

Conrad L. Wirth

The Rio Grande as it emerges from the first canyon up the river from Boquillas; left is Mexico, right is Texas.

men in the National Park Service rose to a high peak, for the right men were appointed to the right positions, the field was encouraged to offer advice and counsel, and the already fine caliber of personnel admitted to the Park Service was maintained.

The war years saw the establishment of Big Bend National Park and Jackson Hole National Monument, as well as a number of other areas. In 1947 the reservation of Everglades National Park realized the hopes of many years' efforts by conservationists. In spite of drastically reduced appropriations — even today Congress appropriates less than one dollar for every visitor to the national parks — and the termination of the vast relief funds that had benefited the parks during the depression, the Park Service continued to care for its areas efficiently while accommodating millions of visitors. Providing proper services and facilities was and is one of the paramount responsibilities of the Park Service, a problem of increasing complexity.

Another important responsibility was, and is to increase public understanding of the purposes of the parks. As Mr. Drury said, "National parks were set aside for the benefit of the people; but in order that the people may benefit to the fullest degree, they need to understand the natural beauties of the parks. Stimulation of man's mental and spiritual faculties is as important as is physical recreation." The corps of ranger-naturalists served more and more people; museums and exhibits were built and equipped, and every form of outdoor enjoyment that was based on appreciation of the natural qualities inherent in the parks was encouraged. Conceiving that the wild animals and birds were the native inhabitants of the parks, and that they too had rights, policies were strengthened to ensure that wildlife would be seen in a natural manner, that the normal processes of nature were preserved and studied. National parks are botanical paradises, where full effort is made to perpetuate the natural ecology of plant associations, so that these areas may serve as outdoor laboratories for scientific and inspirational study.

Perhaps the greatest contribution Mr. Drury made to the national park system was his insistence that its inviolate protection be maintained, regardless what apparent justification might be offered for relaxation of that policy. "Inviolate protection," he wrote, "is the cardinal point. If we are going to whittle away at them [the parks], we should recognize, at the very beginning, that all such whittlings are cumulative and that the end product will be mediocrity. Greatness will be gone."

The past decade saw vicious attacks on our national parks. Certain members of Congress tried to abolish Jackson Hole National Monument after President Roosevelt's proclamation had established it. Patiently, but firmly, the Park Service refused to give in, and it was supported in its position

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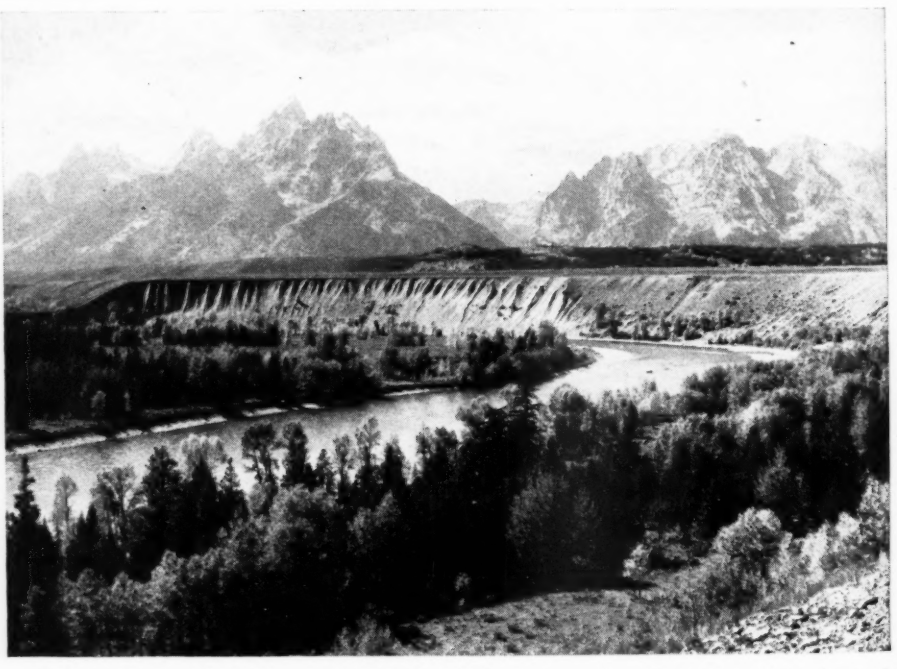

Grand Teton National Park, Wyoming, with Jackson Hole, foreground, and Teton Range in background.

A BOTANIST — in Your Grocery Store

PART II

By **Richard A. Howard**

As a botanist in your grocery store, I also looked on the produce counter and canned goods shelves to see what divisions or families of the plant kingdom were represented in the products on display. Of the lower plants, the algae were not so well represented. Irish moss, a sea weed, was present in dried or powdered form to be used in making a pudding called blanc mange. Under the "dietary foods" I found a box of salt with the legend, "natural iodine from sea weeds." Nature food stores might also carry dulce, an edible red alga, or sea lettuce, both of which are considered appetizers.

The fungi or products of fungi were more abundant. Fresh mushrooms represent the fruiting bodies of a cultivated strain of the common field mushroom. The canned "buttons" are the earlier stages of development of the spore-producing body of the fresh mushroom. Canned truffles, an underground species of mushroom, also appeared on your grocer's shelf. Yeast cakes from the dairy counter are the dried, but still living, plant bodies of a fungus. When yeast cakes are mixed with sugar or starch and water, these microscopic plants start to grow, metabolize and reproduce. Home-made root beer, wine, bread or any raised dough product from the bakery shelf depends on the action of the yeasts or fungi for the fermentation products desired. Also on the dairy shelf, we find products of fungi or bacteria in the various cheeses. The characteristic color, odor, texture and flavor of many cheeses is dependent on the species of fungus used. In fact, the botanical name of the fungus indicates the type of cheese, and vice versa. Thus *Penicillium roquefortii* and *Penicillium camemberti* can be recognized as the fungi responsible for Roquefort and Camembert cheese. The sour milk in containers may be produced by bacteria, which are fungi, although more frequently in our current civilization this is produced chemically.

Lichens, mosses and liverworts are not used for food in our area, although some are used for food by more primitive peoples.

Club mosses were found in the grocery store at Christmas time, when the trailing or running forms of these plants were used in Christmas decorations. The spores of several species of *Lycopodium* are still used in the preparation of medicines, especially pills. The horsetails may be found in some specialty stores represented by the scouring brush which was used widely years ago for cleaning pots and pans and is sold today for the same purpose.

Ferns appeared in the grocery store as potted and ornamental plants for sale on the produce counter, and on the canned goods shelf I found cans of fiddleheads for sale as a vegetable. The fiddleheads are the young, uncurling fronds of the common brake or bracken fern, still gathered and canned in Maine for food.

Gymnosperms or cone-bearing seed plants are well represented in the grocery store. Most of the wrapping paper used at the meat counter and elsewhere in the store is made from the resinous wood of southern pine. The piñon pine seeds are sold in bulk or canned. These seeds of a pine tree, which grows abundantly in the southwestern part of the United States, are a delicacy among nuts. One of the flavorings in gin may come from the berries of the juniper or cedar. On the medicine shelf is ephedrine, widely used for treating colds, which is an extract of a leafless desert shrub belonging to the Gymnosperms.

By far the most useful plants in the grocery store are members of the Angiosperms, that class of plants characterized by having flowers and producing seeds in a fruit. Botanists recognize two sub-classes of the Angiosperms, the monocotyledons and the dicotyledons. In the first sub-class are placed all the grasses, lilies and orchids, and in the second sub-class the broad-leaved flowering plants from our common trees to the asters.

The botanist recognizes many families of monocotyledons in the grocery store. Most important is the grass family, represented by all the well-known cereal grasses such as corn, wheat, oats and rice, as well as the tropical grass from which we get most of our sugar, the sugar cane. The lily family is, perhaps, the second most important family, with onions, garlic, leaks and chives belonging to this family. Of less importance but still represented are the orchid family, the source of corsage flowers and vanilla flavoring; the bromel family which not only supplies handsome house plants but also the pineapple; the ginger family for the spices and flavorings extracted from the roots of members of this family; the maranta family from which is obtained arrowroot starch; and the banana family which yields the ever-popular banana and the cooking banana, the plantain.

Of all the families of the dicotyledons recognized in the grocery store, the mustard and nightshade families seem to dominate the vegetable shelf and the rose family the fruit section of the produce counter. To the mustard family belong cauliflower, broccoli, kale, cabbage, radishes and turnips, while the nightshade family contains

The cheese on the dairy shelf of a modern super-market is dependent on fungi for odor, texture and flavor.

such useful plants as the white potato, eggplant, tomato, green and red peppers and tobacco. The rose family comprises such fruits as strawberries, pears, plums, cherries, apples, quinces, peaches, blackberries and raspberries. Most of our juice fruits, as lemons, limes, oranges and grapefruit, belong to the rue family. A great variety of peas and beans, fresh as well as dried, and, of course, peanuts, are present in the grocery store and all of these are obtained from members of the legume family. The goosefoot family supplies beets and spinach as well as the sugar beet, while the gourd family has such fruits and vegetables as squash and pumpkin, cucumbers and melons, both edible and ornamental. From the composite family comes lettuce, endive, artichokes and salsify. Herbs and spices seem to come primarily from two families: the parsley family which yields dill, coriander, anise, fennel and caraway in addition to celery, parsnips, carrots and parsley; and the mint family which produces such spices as thyme, sage, basil, peppermint, hoarhound and savory.

The botanist, keeping all of these families in mind, recognizes the grocery store as a source of materials for teaching. This past winter one of my beginning botany classes studied the flowers of the mustard family by using broccoli from the grocery store.

In wandering around the grocery store looking for botanical information, I was interested in considering the derivative products represented in the material on display. Among the items in our daily diet, carbohydrates and fats and proteins, all are present in the products in the store. Carbohydrates are the starches and sugars of the cereals and root crops; the fats are represented in the edible oils and the nuts; and the proteins are found chiefly in the peas and beans of the legume family. Daily supplies of vitamins are important, and fresh vegetables from your grocery store supply many of them. The botanist knows that plants offer the best source of vitamins and that all of our needed vitamins can be obtained from plant products. Vitamin A is found in the yellow vegetables such as carrots and squash. The B vitamin group including B_1, B_2 and Niacin is found in yeasts, beans, peas, most green vegetables and even potatoes. Vitamin C is abundant in all citrus fruits as well as spinach, cauliflower and cabbage. Vitamin K is found in spinach and tomatoes and the D vitamin which comes in fish oils is manufactured by the tiny plankton, the sea plants which form the food of the fish.

A botanist can even find extracted digestive enzymes in the grocery store, for the tropical fruit, the papaya, is the source of a digestive enzyme called papain which is sold in bottles as a meat tenderizer. The papaya fruit is edible when green as a cooked vegetable, when ripe as a fruit, and its juice is a delicacy.

I have already mentioned a great many products extracted from plants in the latex of chicle and rubber, the oils, gums, waxes, tannins and resins, but there is still one more product to add to this list, chlorophyll. Chlorophyll is the green-colored substance found in most plants. It is chlorophyll that enables the plant to utilize the light energy of the sun and combine carbon dioxide and water into the many products found in the plant body. Chlorophyll has been used as a coloring material in edible products for many years, but more recently it has been learned that chlorophyll will destroy body odors and so a large number of products are now on the market utilizing this chemical action. The chewing gums, tooth pastes, tablets and liquids well advertised today as destroying body odors present a problem to the botanist and chemist alike, for there is no satisfactory explanation for this deodorizing activity of the chlorophyll. Even dog foods are now utilizing chlorophyll so that the dog may become "more acceptable" in your home.

There remains still one consideration the botanist may give to the products in your grocery store, as he looks at them from the different parts of the plant body represented. He finds there leaves, leaf stalks, stems, roots, flowers, fruits and seeds.

We recognize spinach, lettuce, kale, beet greens, endive and parsley as the leaves of plants, and celery and rhubarb as the petiole or stalk of the leaf. Immature leaves or clusters of leaves as buds are represented by the edible portions of cabbage, brussels sprouts and fern fiddleheads.

Asparagus is the developing stem of a member of the lily family, while

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A Story of the Potato

By **Ora Smith**

WHERE is the birthplace of the potato? At first thought it may suggest indifference that we do not know accurately where such a socially and economically important member of our plant society first saw the light of day. Unlike the grains, the potato tuber is very perishable and hence has not been found in records of the past in its original condition. Fortunately, archaeological records of potatoes have been found frequently represented on burial pots throughout pre-Columbian history. The most authoritative evidence indicates that the home of the potato is the area comprised of northern Chile, Peru, Ecuador, Bolivia and Colombia. Several species of wild tuber-bearing solanums, the parent stock of our domestic potato, grow in the Andean highlands in this area.

Several thousand years before the Spanish Conquest, the Incas had the potato under cultivation. Maize, manioc, cassava and other plants supplied food to the Incas at the lower altitudes; but above 11,000 feet the potato was the principal food. In fact, the potato probably made life possible on many of the high plateaus.

Studies of archaeological problems in Peru have been made more difficult because of the absence of writing and lack of a system of dating during that period. Most of the evidence on the antiquity of the potato and the influence of the potato on the life of the people is based on the pottery of that time which has since been excavated in great numbers.

Early in 1537 one of the most important Spanish conquests was made in the Magdalena Valley. It was here that a scouting party of Spaniards found the potato and hence were destined to be the first Europeans to see and eat the potato.

In neither the coastal areas nor the temperate areas of Peru was the potato considered an important or necessary food. In the highland plateaus, however, the potato was the chief food of the people. They discovered methods of preserving this crop so that it became a safeguard against starvation. It was in these areas many years ago that numerous subspecies and varieties developed and they are today still found there. These plants were selected by the early immigrants and later cultivated by them.

This potato growing area lies largely between 3°N and 22°S of the equator. At the altitudes where they are grown, however, the air and soil temperatures are very low. Although there are dangers of frost at nights, two or more crops can be grown each year. The natives have learned to grow certain varieties which are resistant to several degrees lower temperature than are our commercial varieties in this country. These varieties also are well adapted to the short days of this region. The frost-resistant varieties which are grown at the high altitudes are of poor quality, rather tasteless, and are used mainly for the frozen dried product known as chuno. The importance of the potato in those countries and the heights which potato production has reached is shown by the great numbers of named varieties which are found in that area today. Eighty-nine varieties were recently exhibited at the Potato Fair in La Paz.

Most people have assumed that preservation of potatoes by dehydration is a process developed in modern times. The Indians of Pre-Spanish Peru, however, regularly utilized this method of preservation. Potatoes were spread on the ground and left to freeze during the night. To make tunta, or white chuno, the potatoes were covered with a layer of straw early in the morning; for common chuno, the straw was omitted. The next day water was squeezed out of the potatoes by treading them with bare feet. The process was repeated on four or five consecutive days, the chuno then dried off and stored. Flour was made from this dried product and used in bread and stews. This staple of their diet was transported by llama back to lower valleys and the coastal areas and traded for other foods and utensils.

There is much controversy as to where, when and by whom the potato was introduced in Europe. Probably the potato left South America not later than 1569 and its first European introduction was in Spain a short time later. It was being used as food at Seville in 1573. The Russians stated that the potato came to Europe from Chile, not from the Peru-Bolivian area. Salaman of England presents convincing evidence that the first potatoes to reach Europe had their origin in Colombia or Peru.

In 1596 John Gerard published the earliest known catalogue of growing plants. This probably is the first printed mention of the potato. In his famous "Herbal," published in 1597, Gerard devoted an entire chapter to the potato. It was in this publication he stated that he received "roots" of the potato from Virginia. Since this was interpreted by most readers to mean that Virginia was the native home of the potato, historians were misled as to its true origin for about three hundred years. Many descriptions of the potato followed during the next hundred years. Salmon in his "Herbal," published in 1710, was probably the first to call it the "Irish" potato.

Millions of people associate the potato, *Solanum tuberosum,* with Ireland and the Irish people. This association existed as early as 1693. Less than fifty years after its introduction into Ireland, the potato was the staple article of food in the greater part of that country. The majority of the population was almost entirely dependent on this crop for existence and it was conceivable that a failure of the potato crop could cause national disaster. In fact, prior to the famine of 1845, the

potato crop had failed in several areas, causing considerable hardship. In 1845 and 1846 the crop failure was nation-wide.

The late blight disease, *Phytophthora infestans,* which came from America, was the cause in Ireland of the destruction of vines and decay of the tubers before or shortly after harvest. The disease occurred throughout Europe at the same time but since no other country was so wholly dependent on the potato for food, the result was considerably less destructive to the lives of others. Winter supplies of potatoes were soon depleted. The pig, which usually was sacrificed to pay the rent, was now eaten. Farm troubles arose when the landlords insisted on their rent and evicted when it could not be paid.

A parliamentary struggle ensued as a result of persons taking various sides on the question of avoiding the famine. The great area of Free Trade had its origin probably as a result of the discussions arising from the unusual behavior of a simple vegetable.

Blight in 1846 resulted in practically complete loss of the crop. Salaman states that it would be impossible to exaggerate the horror of these days or to compare them with anything that has occurred in Europe since the Black Death of 1348. The best estimates state that one million lives were lost in Ireland because of the potato famine. Scurvy, cholera, dysentery and typhus fever, all a result of the potato famine, also accounted for more than another 100,000 persons. Probably an additional million or more persons were lost to Ireland by emigration. This catastrophe resulted in the first occasion in English history of the government's planning and financing relief measures on a comprehensive scale. By March, 1847, there were at least three million persons on relief, almost half the country's population.

The "Potato Famine" had a very direct effect on emigration. Tenants, after having lost their farms and stock and spent all their cash, had the choice of holding onto the land and starving or giving up and emigrating. Over a million left the country during the period of 1846 to 1850, and most of them came to the United States.

The potato probably was introduced in the United States early in the eighteenth century. As late as 1771, only two varieties were listed. During the nineteenth century, thousands of varieties were originated by American plant breeders, but only a relatively small number were introduced and proved worthy of large scale production.

During the early years commercial potato production was centered in New England and the Middle Atlantic States. These areas developed westward with the opening of new land and soon the potato was grown commercially in every state in the United States. Production in this country showed a steady growth from about sixty-six million bushels in 1849 to an average of about 411,000,000 bushels per year during the five-year period of 1920-1924. The greatest single year's production occurred in 1946 with over 474,000,000 bushels.

Potato acreage reached its peak in this country during the period 1915-1919; the largest single year acreage of 4,384,000 occurred in 1917. Acreage now has decreased to slightly more than one and a third million. This means, of course, that efficiency of production as reflected in yields per acre has been on the rapid increase. From an average yield of seventy bushels per acre for the period 1890-1894, yields have increased until during the past several years the average has been over two hundred bushels to the acre. Annual per capita consumption, on the other hand, has decreased from one hundred fifty-five pounds in 1929 to about one hundred five pounds in 1950.

Since World War II, growers, experiment station personnel and others have been emphasizing the culinary quality of potatoes and its value in satisfying the consumer and in stimulating sales. By the use of modern methods of improving quality, such as better grading, specific gravity separation for quality, and use of the potato hydrometer, the consumer will soon be supplied with potatoes meeting his requirements regardless of the method of preparation in the home, hotel or restaurant. While most potatoes are prepared for the table from the raw state by the consumer, many millions of bushels now are utilized in the potato chip industry, frozen french fries, canned, potato sticks, dehydrated mashed and in the pre-peeling industry. During periods of great overproduction, many potatoes also are utilized as stock feed and for manufacturing of potato starch and alcohol.

The food value of the potato has been established by experience down through the years. In recent times these views have been substantiated by experimental evidence. Chemical analysis and food value of potatoes vary considerably between varieties and within the same variety there may be great variability as a result of soil type, soil moisture, fertilization, spray program, temperature, maturity and other factors. As an average, about seventy-seven per cent of the tubers is water. The main food constituent of the potato is starch, which comprises about fourteen per cent of the potato. It is this portion of the tuber which has made it the great food product it has been down through the centuries.

The tendency in the past has been to breed and grow varieties which produce high yields, with less attention given to increased starch content and mealiness. As long as most varieties, regardless of mealiness, are sold for the same price per hundredweight there is little incentive to improve culinary quality of the tubers. Where commercial starch and alcohol production are important industries, as in some European countries, certain varieties high in starch content, twenty-five to forty per cent of fresh weight, have been developed and are widely grown. Nitrogen-containing substances, such as proteins and amino acids, comprise only about two per cent of the total weight. Useful and assimilable quantities of the important mineral elements, such as iron, calcium, magnesium, sulfur, chlorine and potassium, are present in the tubers. Others necessary for health, such as copper, boron, silicon, manganese, fluorine and iodine, are also present in small amounts. Vitamins B_1 and B_2 are present in fair amounts, while ascorbic acid or Vitamin C is present in abundance. The potato, in numerous instances, has prevented scurvy from becoming a national catastrophe in some countries.

In the face of these many changes, the potato, a native of the Americas, still remains one of the most nutritious, wholesome and inexpensive food items in the diet of Mr. and Mrs. America and family.

Horticultural Commentary

A NEW HYDRANGEA IS DESCRIBED

By **T. H. Everett**

Not to plant breeders alone are we indebted for the numerous superior plants that grace our gardens. Many of the best arose as mutants or "sports" or as chance seedlings, the latter sometimes of hybrid origin. *Fatshedera Lizei* and *Primula kewensis* are examples of such casual hybrids. The former was discovered in a nursery in France in 1910, the latter on a greenhouse bench in the Royal Botanic Gardens, Kew, England, in 1898. Neither could possibly have arisen in nature because their parent species are separated geographically, those of *Fatshedera* being the European *Hedera Helix hibernica* and the Japanese *Fatsia japonica Moseri,* those of *Primula kewensis,* the South Arabian *Primula verticillata* and *Primula floribunda* from the Himalayas.

An example of a superior plant of hybrid derivation that occurred more recently is *Ilex altaclarensis* "James G. Esson," which I selected and named from a batch of seedlings raised by James G. Esson and grown at The New York Botanical Garden. Superior plants not of hybrid origin also occur spontaneously. These may be found in the wild or among garden plants. One, *Forsythia viridissima bronxensis,* was selected originally from a batch of seedlings at the Boyce Thompson Institute for Plant Research by J. H. Beale and was named by me from propagations of the original plant that were in cultivation at The New York Botanical Garden, without record of their origin after the parent plant at the Boyce Thompson Institute had died.

Everyone who has observed batches of seedlings of *Kolkwitzia amabilis, Cornus Kousa, Kalmia latifolia,* and many other species has noted the surprising amount of variations between individual plants — variations in size, habit, color, floral characteristics and so on. When desirable new characters or combinations of characters appear in trees, shrubs and other perennial plants, the individuals that possess them may usually be multiplied by vegetative propagation and, in this way, new garden varieties (or clons) come into being.

Hydrangea Petiolaris "Skylands Giant"

For the new variety of *Hydrangea petiolaris* here described and pictured, I propose the name "Skylands Giant," in commemoration of "Skylands," the estate of Clarence McK. Lewis at Sterlington, N. Y.

This superior variety was first called to my attention by Mr. Lewis two years ago. The type plant is growing against the main house at "Skylands" along with other specimens of the same species. Mr. Lewis noticed the greatly improved quality of the blooms of the plant now named "Skylands Giant" and suggested to me the desirability of propagating it for eventual wider dispersal. A few cuttings were taken to The New York Botanical Garden and, through the generosity of Mr. Lewis, arrangements have now been completed to obtain a sufficient

***Forsythia viridissima bronxensis* is an example of a superior plant that occurred spontaneously.**

***Ilex altaclarensis* "James G. Esson," selected and named from seedlings raised by Mr. Esson and grown at the Garden.**

number to make it possible to raise enough young plants of "Skylands Giant" to offer it within a year or two as a plant distribution to members of the Garden.

Except for the markedly large size of its sterile flowers, "Skylands Giant" is essentially similar to more typical forms of *Hydrangea petiolaris*. It is a tall-growing, non-evergreen, climbing vine that by means of aerial roots attaches itself firmly to masonry and to tree trunks. The lustrous green, egg-shaped leaves narrow rather abruptly at their apices to short, tapered points; their bases are straight across or are slightly cuneate rather than heart-shaped.

"Skylands Giant" blooms in early summer. Its flattish flower clusters measure eight to ten inches across. The center flowers are numerous, tiny and fertile. Several showy white sterile flowers are disposed about the perimeter of each cluster. These measure from one and a half to two inches (and average at least one and three-quarter inches) in diameter. By way of contrast, the sterile flowers of the more normal type of *Hydrangea petiolaris* growing at "Skylands" measure an inch across and those on specimens in the herbarium of The New York Botanical Garden from three-quarters of an inch to one and a half inches, with an inch being a good average.

Hydrangea petiolaris—the climbing hydrangea—is a handsome vine that flourishes in any reasonably good soil and may be used effectively not only as a covering for tree trunks and walls of buildings, but also for scrambling over free standing walls and rocks. It thrives close to the sea. The new "Skylands Giant" should prove an acceptable addition to our list of hardy vines.

Comparison between the new variety "Skylands Giant" and a typical form of *Hydrangea petiolaris* shows the improved quality of the former.

Foliar Feeding

Feeding plants through their leaves is not nearly as new a practice as the moderns would have us believe. The newness consists largely of the scientific acceptance of the value of foliar feeding and of its recommendation to gardeners based on scientific experiment.

The head gardener under whom I served well over three decades ago was a great advocate of foliar feeding. He did not call it that, but he did make sure that his indoor grape vines, his cucumbers and his chrysanthemums were sprayed daily during their seasons of vigorous growth with diluted liquid manure and with a liquor made by soaking soft coal soot (Scotch soot) in water. As was the fashion among apprentice gardeners in those days, I did rather than questioned, but the doing consisted of carrying so many hundreds of pails of liquid fertilizer to the journeymen gardeners who sprayed the foliage with it that I shall never forget the importance the head and his foremen placed upon the practice.

Not many years later, when I served as a journeyman under the renowned Scottish gardener, Allan Falconer, I saw the advantages of foliar feeding further demonstrated. Falconer demanded, and got, from his assistants produce that was successfully exhibited at the greatest flower shows throughout Britain. Like so many of his countrymen, he was a magnificent

(Continued on page 121)

The Root Nodules of Leguminous Plants

By **William J. Robbins**

I READ recently in a Swedish Journal (Acta. Chem. Scand.) three articles by a Finnish investigator, Dr. A. I. Virtanen of the University of Helsinki, which intrigued me. They were concerned with the pigments which occur in the nodules on the roots of various legumes, members of the pea family.

These swellings or nodules were noted by the early herbalists. Fuchs (DE HISTORIA STIRPIUM) in 1542 showed them in drawings of various legumes including *Vicia Faba,* Bock (DE STIRPIUM) pictured them in 1552 on the same plant. In Matthiole's Dioscorides (1568) they are shown on the roots of *Vicia Faba* and *Lathyrus sp.* and Malpighii (ANATOME PLANTARUM) in 1675 included them in drawings of *Vicia Faba* and *Phaseolus.* [These books are in the Library of The New York Botanical Garden.] Dig up a clover plant or a pea plant; wash the roots and see nodules for yourself, if you have never observed them before.

The significance of these structures was a subject of dispute. They were regarded by some as normal storage organs, by others as latent fruits, abortive roots, lenticils, tumors of one kind or another, galls caused by insects or nematodes. It required some three hundred years after Fuchs published his DE HISTORIA STIRPIUM COMMENTARII INSIGNES before the true nature of the nodules was understood and their importance in determining the role of legumes in maintaining the fertility of the soil was finally demonstrated. The researches of Virtanen add another chapter to this long history.

In thinking about his contributions, it occurred to me that others who do not have access to the journal in which they appeared might find the results of interest. However, to make them significant to the uninitiated, it will be necessary to give some background and put them in their proper setting.

THE BALANCE OF NATURE

One of the most complex and important features of the world about us is what is frequently referred to as "the balance of nature." Usually this phrase refers to some balance between living organisms which may have been upset by an act of man. For example, if the population of a predator, say the wolf or the fox, is eliminated or materially reduced by poisoning or trapping, rabbits and mice may multiply until they become pests. The elimination of the predator upsets the balance of nature. An insect introduced into a section of the world where it was not known before may multiply rapidly and become a serious threat until its enemies or diseases multiply, too; then, the balance of nature is re-established and the insect assumes a less prominent place in the scheme of things.

THE CARBON CYCLE

There is, however, another kind of natural balance, one which involves non-living material, though living things play an important role in maintaining it. I refer to the cycle of some of the chemical elements.

For example, the element, carbon, is a major constituent of chemical compounds in the foods we eat and in the fuel we burn. A substantial part of this carbon, combined with other elements in the form of sugar, fat or protein is oxidized in the assimilation of our food and escapes from our lungs into the air as carbon dioxide. The same thing happens when the hydrocarbons of petroleum and coal or the cellulose and lignin of wood are burned. Carbon dioxide is of no value to us as food and cannot be used as fuel. It would seem, therefore, that the balance which exists between carbon as carbon dioxide and carbon combined with other elements in a form which can serve as food or fuel could not be maintained and in time all the carbon would exist as carbon dioxide with most disastrous results for us.

Fortunately, green plants have the unique ability of combining gaseous carbon dioxide with other elements into compounds which are our food and fuel. As long as green plants grow, there is no danger that the carbon balance in nature will be upset and all the carbon in the world will be locked up in the form of carbon dioxide. There is, therefore, a cycle in nature through which the various chemical compounds of carbon pass and the proportions between the various forms are maintained within more or less narrow limits.

There are cycles for other elements, too, among them sulfur, oxygen, hydrogen, and nitrogen; and it is highly important that we understand how these cycles work and how the balances are maintained between the various forms of the elements concerned, lest man in his ignorance interfere with them too drastically, with serious effects on his own comfort and well-being.

THE NITROGEN CYCLE

One of the most interesting and important of these cycles is that which concerns the element nitrogen. Nitrogen exists in various forms; as free or gaseous nitrogen, in combination with hydrogen as ammonia, united to oxygen as nitrites and nitrates and combined with carbon, oxygen, hydrogen and other elements in complex organic compounds, among which the proteins are of great importance because they are one of the major items of our food.

Nitrogen passes from one form to another through a nitrogen cycle. Organic compounds of nitrogen (protein, for example) are transformed by decay to ammonia; the ammonia may be absorbed by plants and built up into protein, or it may be oxidized by nitrifying bacteria in the soil into nitrates and the nitrates transformed by plants into protein. Neither ammonia nor nitrates can satisfy the nitrogen needs of animals; animals require protein or

amino acids, the building blocks of proteins. The ability of plants to build protein from ammonia or nitrates is, therefore, very important to us. The protein eaten by animals is stored in their bodies or broken down into simple substances which are excreted as urea or other compounds. The death and decay of the plant or animal starts the circuit once more.

Gaseous Nitrogen and the Nitrogen Cycle

One important step in the cycle was omitted from the description given above. At any stage in the transformation of nitrogen, some of the combined nitrogen may be changed into gaseous nitrogen (by the action of some microorganisms or by combustion) and nitrogen in this form is extremely inert. It does not combine easily with other elements, animals can't assimilate it, and it is entirely useless for almost all plants with which we are acquainted.

One of the problems with which man has struggled has been to find economical ways of causing gaseous nitrogen to combine with other elements. These efforts have been successful and there are chemical factories in this country and abroad which "fix" free nitrogen, that is, which cause gaseous nitrogen to combine with other elements to form cyanamid, ammonia or nitrates and thus make compounds which can be used as fertilizers on farms and gardens, or serve as the starting points for the synthesis of explosives and other chemical compounds.

The question still remains, however, why in all the eons through which the earth has existed and long before man found methods of fixing nitrogen all of that element should not have become locked up in gaseous form. Is there any way in nature through which gaseous nitrogen is returned to some combined form?

Living Organisms and Nitrogen Fixation.

This problem received a great deal of attention during the last one hundred years or so and numerous reports appeared purporting to prove that some bacteria, some of the common algae, of the filamentous fungi, of the ordinary crop plants and even the protozoa utilize gaseous nitrogen; that is, combine it with other chemical elements. Most of these reports have not been confirmed; research in this field is very difficult, and errors of fact or interpretation have been common.

The complete and dependable evidence now at hand demonstrates that no animal, none of the seed plants and, with the exception of a few kinds of microorganisms, none of the lower plants is known to be able to assimilate gaseous nitrogen. There are, however, bacteria in the soil belonging to the genera *Azotobacter* and *Clostridium*, a fungus, *Phoma* sp. and perhaps a few others which have the unique power of fixing gaseous nitrogen. In addition, there are the nodulated legumes, plants of the pea family with swellings or nodules on their roots which in many respects are the most interesting of all the few living things known to serve in maintaining the nitrogen balance in nature by returning gaseous nitrogen to some form combined with other chemical elements.

Drawing from Fuchs *De Historia Stirpium* (1542) showing root nodules on *Vicia Faba*.

Legumes and Soil Fertility

It had been early recognized that crops of legumes benefited the soil. Theophrastus (370-285 B.C.) noted that beans were not a burdensome crop to the ground, but even seemed to manure it. Cato in the second century B.C. wrote in his De re rustica that lupines, field beans and vetches manure wheat land. It became recognized that the extent to which legumes were cultivated was an important influence in the development and maintenance of a high level of agriculture. In fact, the cultivation of legumes has become a highly important factor in the economics of food production and in the systems (rotation of crops, for example) of handling cultivated soils and maintaining their fertility.

Legumes and Nitrogen Fixation

But why should legumes be so much more beneficial for soil fertility than wheat, corn, oats, grass or other crops? The answer to this question did not become clear until the latter part of the nineteenth century. Boussingault (France) in 1838 found by experiments in which the plants were grown in pots that peas and clover took nitrogen from the air while wheat did not. Hellriegel (Germany) in 1886 demonstrated that nodulated legumes could assimilate gaseous nitrogen and that the presence of nodules was necessary for this to occur. Beyerinck (Holland) in 1888 isolated and cultivated bacteria from a number of species of leguminous plants; these bacteria were responsible for the development of the nodules.

The evidence now available shows that:

(1) Suitably nodulated legumes can assimilate gaseous nitrogen.

(2) Non-leguminous plants and legumes which lack nodules are unable to fix gaseous nitrogen.

(3) The nodules are produced by the infection of the legume root by a special kind of bacterium, *Rhizobium* sp. The invasion of the root by the bacteria causes a local swelling on the root. This is the nodule.

(4) There are several kinds of *Rhizobium*. The bacteria which produce nodules on one kind of legume may not be able to do so on another species.

(5) It is frequently advisable to introduce the suitable bacteria at the time of planting of the legume seeds to insure adequate nodulation.

(6) The presence of nodules increases the growth and vigor of the plant and adds combined nitrogen to the soil.

(7) The nitrogen fixed by a crop of legumes and therefore available for other plants is sufficient to improve

the fertility of the soil and may amount to between fifty and one hundred pounds per acre per year.

(8) The legume without the bacteria is unable to assimilate gaseous nitrogen. The bacteria, *Rhizobium* sp., cultivated by themselves outside the plant, cannot fix free nitrogen. Only when the plant and bacteria are associated as they are when nodules develop does fixation occur. The plant-bacterial association is so intimate that in partnership they accomplish what neither can do alone.

(9) Some legumes do not have nodules. Among these are *Cercis canadensis,* the redbud or Judas tree, *Gymnocladus dioica,* the Kentucky coffee tree, several species of *Cassia* and *Gleditsia triacanthos,* the honey locust.

(10) Root nodules occur on the alder, *Alnus* sp., on *Ceanothus, Myrica* and some other species of plants. Leaf nodules are common on members of the family Rubiaceae (see Journal of The New York Botanical Garden, vol. 45, pp. 193 to 199, for 1944). The importance of these nodules is unknown.

(11) Galls produced by eel worms, by infection with the crown gall bacteria, or by other means may be mistaken for nodules resulting from the presence of the legume bacteria. Only the latter are important in nitrogen fixation.

To obtain the knowledge briefly summarized above required a great deal of hard work. A monograph by Fred, Baldwin and McCoy on Root Nodule Bacteria and Leguminous Plants, published in 1932, has reference to nearly 1,250 papers and 482 separate articles appeared on this subject between 1932 and 1938.

There have been differences of opinion and bitter arguments have raged on the rightness or wrongness of experimental data or on their interpretation; reputations have been made and lost. Through it all the discoveries reported by one man have been patiently checked by others and with time and labor truth has taken shape. As Edmund Burke once said, "The march of the human mind is slow." The comforting thought is that it does march.

Hemoglobin and Nitrogen Fixation

In spite of the substantial advances which have been made in our knowledge of the role of nodulated legumes in the nitrogen cycle, there are still a number of unsolved questions. How does this fixation of gaseous nitrogen occur in the nodule? Nitrogen is so inert and it is so difficult to make it combine with other elements that high temperatures, high pressures and other extreme methods are required in the chemical factories where nitrogen is fixed. In the nodule the process goes on quietly at ordinary temperatures, pressures and other conditions without even interfering with the delicate life processes of either legume or bacteria. Evidently the process of fixation of nitrogen in the nodule must be quite different from those used in chemical factories. This brings me to Virtanen's observations.

Virtanen has investigated the fixation of gaseous nitrogen by nodulated legumes since 1927, when his first publication on the subject appeared. Recently, he has been concerned with an extremely interesting aspect of the problem which may eventually furnish answers to some of the basic questions on nitrogen fixation by living organisms. He has studied a hemoglobin-like pigment (which he calls leghemoglobin) in the nodules of legumes and its relation to nitrogen fixation.

He was not the first to note or investigate this pigment. Prazmoski, a Pole, reported in 1889 that young nodules were pink and became green with age. Fifty years later, Kubo in Japan demonstrated the red pigment to be a hemoglobin much like that which makes animal blood red. The pigment is not produced by a legume which has no nodules, nor by the legume bacteria when grown alone; it is produced only by the nodule. You will recollect that nitrogen fixation also is a property of the nodulated legume and not one of either the legume or the bacteria alone. Virtanen's great contribution was to prove a direct relation between the concentration of leghemoglobin in the nodule and the amount of gaseous nitrogen fixed during the symbiotic association. Smith (England) has confirmed Virtanen's observations and Jordan and Garrand (Canada) have found that the efficiency of various strains of legume bacteria in fixing nitrogen can be determined by measuring the amount of leghemoglobin in nodules produced by the bacterial strain concerned. As usual, practical applications follow in the train of fundamental discoveries.

This is all an extremely intriguing and exciting development, not only because of what further we may learn about nitrogen fixation but for other reasons, too. Hemoglobin, which is a combination of an iron-containing red pigment (hemin) and a protein is a major constituent of our blood; hemoglobin combines with free oxygen and transports it from our lungs to other parts of the body. Now we learn that a substance intimately concerned in some way with the fixation of free nitrogen is a hemoglobin differing from ours only in the protein part of the molecule. How does it work? This, unfortunately, we do not know. Like so many stories in science, this one is still unfinished. We cannot help, however, being a bit astonished that hemoglobin, so characteristic of animals, has been found in plants.

We have known since the work of Willstätter some forty years ago in Germany that chlorophyll, the magnesium-containing green pigment in plants which enables them to "fix" gaseous carbon dioxide, is strikingly similar in chemical structure to the hemin of hemoglobin.

The chemical similarity between chlorophyll, the "vital" pigment of green plants, and hemin, the vital pigment of most representatives of the animal kingdom, and the identification of hemoglobin in the nodules of legumes emphasizes that plants and animals are more nearly related than we sometimes care to admit. We are so accustomed to emphasizing differences that we may overlook similarities and fail to appreciate that because of these similarities much of importance for animals and human beings can frequently be learned from a study of the life processes of plants.

This brief account emphasizes also that the discovery of scientific truth is not the property of any one nation. Germans, Poles, French, Finns, Japanese, English, Americans and citizens of other countries too, have all added a bit to what we now know about the nodules of legumes. Let us hope that Virtanen and his colleagues and other scientists elsewhere will continue to add to our knowledge of this important natural phenomenon.

Creggan Thie

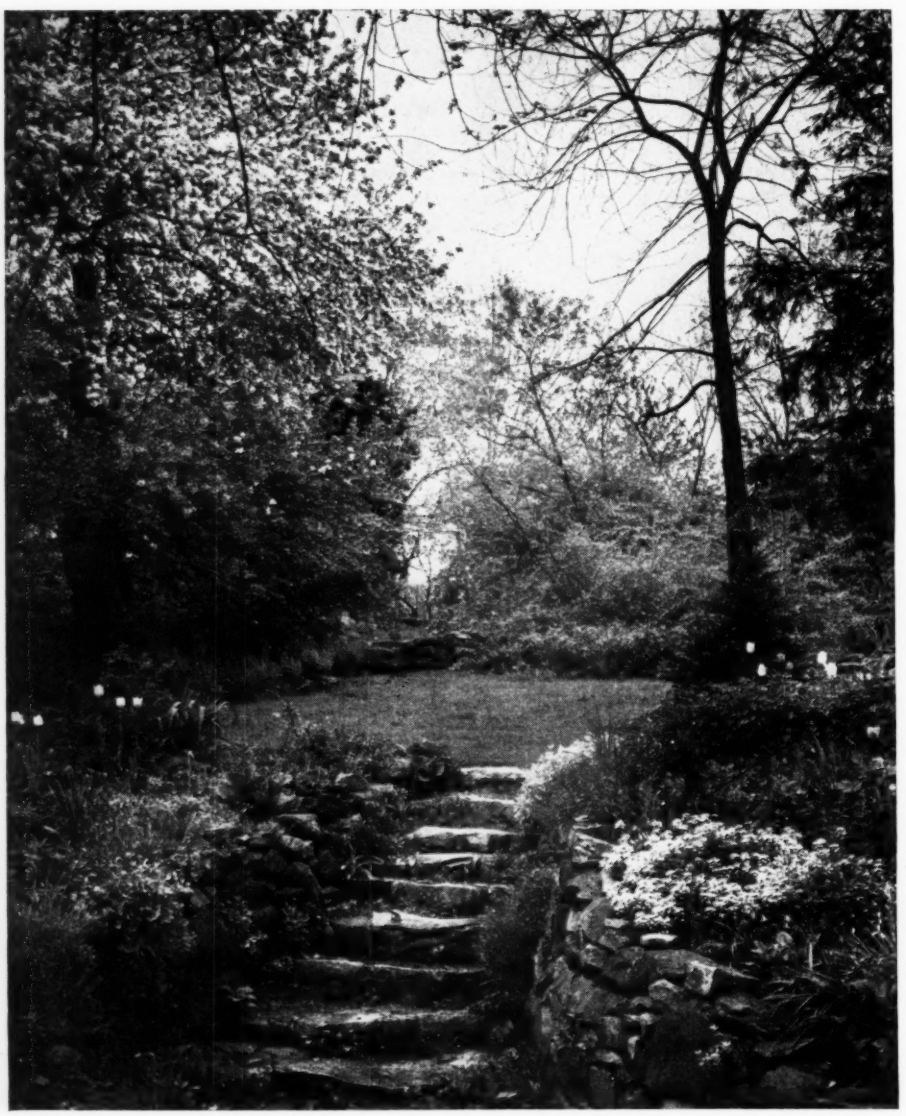
By Henry A. and Thea M. Gleason

Yellow lady slipper, *Cypripedium pubescens.*

EVEN the real estate man, when he reluctantly showed us the place, said we would not like it. A few days later, when he pocketed his commission, he was probably grateful for suckers.

It really did not have much to recommend it, at least not much plainly in view. The house was Old. There is a difference between Old and Antique. Old implies something more or less dilapidated, while Antique means something aged but still well preserved and charming. Yes, the house was Old, not Antique. Making it Antique was quite a chore and took the whole summer to accomplish, but that is another story.

The garden was neither old nor antique. It was mostly brand new, a brand new growth of poison ivy, cat brier, and honeysuckle. These pertinacious vines had been at work only five years and had not yet engulfed everything. They were all over the stone walls and many of the shrubs and were starting to climb the trees. Honeysuckle was sending out long runners ten feet into the unkempt lawn. Another five years would have taken all the lawn, five more and the shrubs would be dead. We were just in time to save them.



Stone wall with rock plants; "Old Faithful" apple tree in full bloom at the left.

When we read in garden magazines of the successful rehabilitation of some neglected place, we get the general idea that the process is one of great joy. That is wrong. It is a process of hard work and lots of it, of dirt and grime, of sweat, not a refined perspiration, but real sweat running into one's eyes, and none of the work alleviated by the thought that you will probably come down with poison ivy tomorrow or next day. Repairing the house was not work for us. It gave lucrative employment to a considerable number of burly men, but to us it was merely a headache, and headaches are seldom pleasant.

Eventually the garden was uncovered and then we learned that we had quite a place; just a little place, to be sure, but an unusual one, a place capable of considerable charm, a place utterly unlike any other garden in the vicinity. Its chief attraction was its seclusion, far back from the street and invisible from it when the leaves are on the trees, and surrounded on both

Chickweed, *Stellaria pubera*, blooms among ferns.

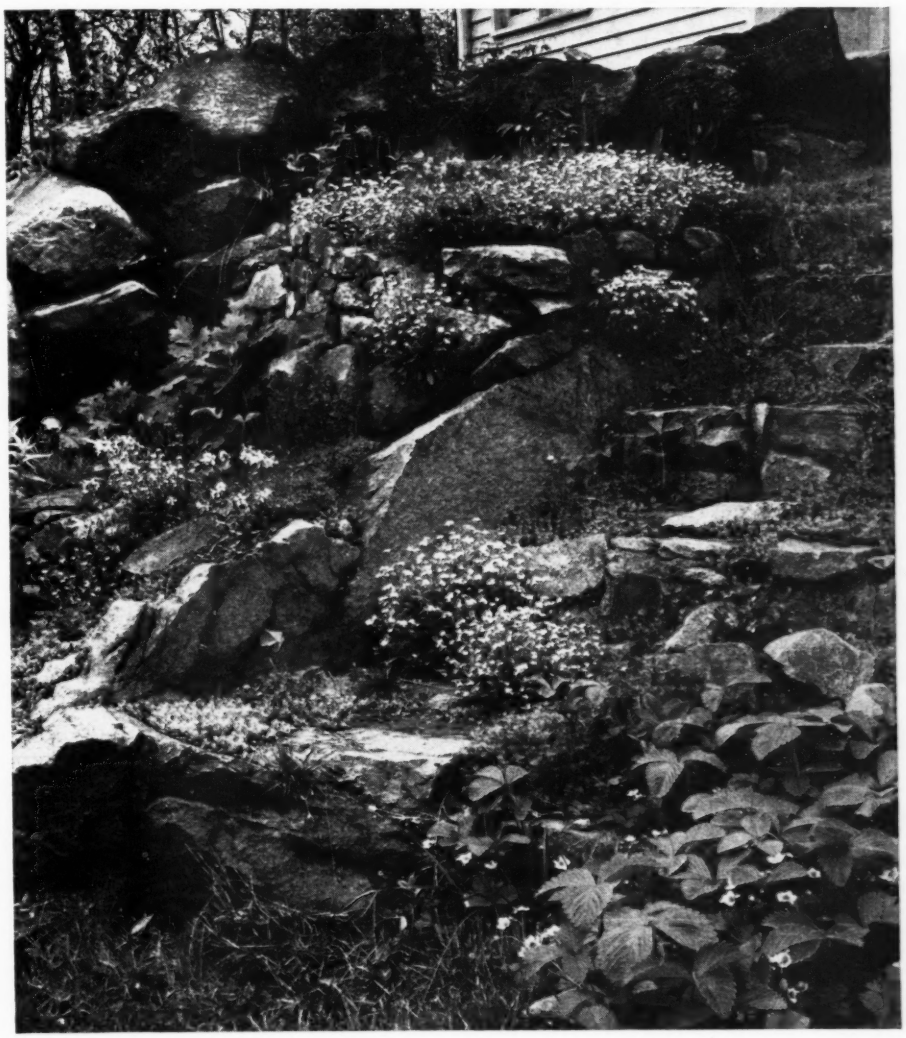
sides and the rear by woods; woods so full of cat brier that not even a small boy goes through them. There was an old stone wall along one side and the back. Huge ledges of rock projected in several places, sometimes as flat shelves, sometimes as low vertical cliffs, and one big rounded one was promptly named the "Elephant." Our grandchildren are always interested in scrambling up on the "Elephant's" back. Three-quarters of the land was sloping and the only level part was at the extrême rear. Two big flat ledges in the middle of the garden were overgrown with thickets of lilac and forsythia and other thickets of lilac and pear grew along the north side. There were several fine trees of spruce which, with the thickets, divided the garden into separate areas concealed from each other. New vistas are opened as one walks past these natural screens and give an impression of size far greater than the actual dimensions.

It was certainly an old-fashioned garden, developed by our predecessors without any regard for landscape art, but for which these common old-fashioned plants had done all that might be expected from a professional landscape architect. Neither were there any interesting plants except three kinds. There were two immense specimens of *Hydrangea paniculata* in front of the house, several shrubs of *Phoinia villosa,* not often cultivated here, and a thirty-foot tree of *Abies concolor*. This tree was moved by a stone mason and at the wrong time of the year. It is still alive and healthy.

Our first task was to give the place a name. We reflected on hundreds, beginning of course with Dewdrop Inn and culminating in poetical names of classical origin. Finally we got a dictionary of the Manx language, since the better half of us is of Manx descent, and in it we found two appropriate words. A *creggan* is a rocky place in the middle of a field, and we had several. A *thie* is a little cottage, and we had it. So we combined the two words and christened the place Creggan Thie.

This formality completed, we turned our attention to the garden. First, we built probably two hundred feet of stone wall to prevent erosion. One wall breaks the slope at the rear of the house and makes a level plot of lawn surrounded by flower beds which are in bloom all season, beginning with tulips and a fine crop of *Phlox divaricata* and ending with purple alyssum in late fall. Here we sit in complete seclusion, visible only to passengers in the Boston planes as they fly overhead. Here on summer evenings we enjoy our two kinds of firefly, the one emitting single flashes of yellow light, the other double flashes of green.

Another, about three feet high, is a dry wall, and planted to many kinds of rock plants. The slope in front of the house, too steep for easy use of the lawn mower, was planted to pachysandra, which did remarkably well. A little outside dining plaza was developed at the north end of the house, shaded by a large wisteria and approached by three stone steps. The risers of these steps are longer than the treads, making a sort of rectangular flower pot at each end. These are planted to ferns and other shade-lov-



Steps to the strawberry bed; forget-me-nots on the rocks. At left, grape hyacinths and *Phlox divaricata*.

ing plants and in summer a tuberous begonia usually blooms there very nicely.

Hundreds of ferns and hardy perennials were planted along the boundary walls. Even a trailing arbutus was brought from our former home and grew well for several years, until it finally succumbed to rabbits. The lawn, which occupies only a small portion of the area, had to be completely rebuilt. Many shrubs and trees were removed and virtually no new ones were planted for lack of space. A tiny spot was leveled and planted to strawberries. Little by little various kinds of plants were added here and there until today we have about four hundred distinct species, excluding horticultural varieties. This figure includes the weeds, but they have not been much of a problem since the first year or two.

We have never gone in for gaudy floral displays, except for a bed of tulips in spring and one of marigolds to give color in late summer. We have never tried to specialize in any one kind or class of plants. We have tried to get as wide a variety as practicable but only a few plants of each. Our friends seem to like it that way. They like "Old Faithful," our centenarian apple tree, loaded with blossoms in May; our species tulips, with as many as eleven flowers on a single stem; our dwarf daffodils, only four inches tall; our "Persian Carpet" of dwarf dianthus; the aged hydrangeas with a thousand sprays of flowers; the flourishing colony of maidenhair fern; the wild chick-weed with its big star-shaped flowers; the seven-foot stems of *Lilium superbum*. And most of all, they like our strawberries!

NATIONAL PARKS (from page 104)

by the national conservation organizations and their members. After eight years' controversy, the issue was settled by the addition of the monument to Grand Teton National Park. The Corps of Army Engineers unsuccessfully sought to build a dam that would have flooded 20,000 acres of critical wildlife habitat and virgin forests in Glacier National Park, and yet another would have destroyed parts of Mammoth Cave. The Bureau of Reclamation planned a power tunnel that would have diverted the Colorado River out of the Grand Canyon. This was defeated, but the Bureau still contemplates other projects that would flood parts of the Grand Canyon and most of the magnificent canyons of Dinosaur National Monument. Livestock interests petitioned to graze large herds of cattle in the national parks, and even to be given control of the grasslands in these reservations. There were nine bills in Congress at one time that would have eliminated parts of the incomparable rain forests from Olympic National Park, so that it might be subjected to clear cutting.

Mr. Drury stood steadfast against these attacks, winning sometimes by tactful cooperation, sometimes by

adroit maneuvering, but usually by adamant firmness. He has left the new Director, Conrad L. Wirth, a national park system unexcelled in the world for superlative natural values, for contributions to the public welfare, and for potential usefulness to our culture.

It is not enough, however, that the Park Service have a strong and sincere director, which Mr. Wirth will be. He must be aided by the active interest of the citizens. As a government official, his actions are limited to those prescribed by his office, and he cannot appeal to the public when the parks are endangered. Therefore, there is need for public service organizations to alert the people to those dangers, so that they may make their wishes known. The National Parks Association was founded to lead the effort to develop public understanding of the importance of the national park program and to inspire the people to rise in defense of their great national parks and monuments. It welcomes as members every citizen who is willing to play a part in this work.

HERB GARDEN (from page 102)

rose, oakleaf and many other geraniums, as well as the different thymes are appropriate. Lemon-verbena *(Lippia citriodora)* and bergamot mint *(Mentha citrata)* are *musts*. Perilla *(Perilla frutescens* var. *crispa)* is fragrant after frost touches it. The flower heads and some leaves of lavender *(Lavandula vera)*, the bright flowers of calendular or pot marigold *(Calendula officinalis)*, and the French marigolds *(Tagetes erecta* and *T. patula)*, seed heads of bergamot *(Monarda didyma)*, and clove pinks supply color. The blue of delphinium and larkspur, the pink of snapdragons, and the red of geraniums are especially vivid. Add whole, slightly crushed spices such as cloves, cinnamon, nutmeg, ginger; orange and lemon peel, dried and ground; or tiny sandalwood chips, a few crushed tonka beans, a handful of whole star anise. What a pleasant evening you can spend reading in front of a fire, Chinese bowl heaped with hidden scents at your finger tips, heat wafting the thousand fragrances of summer through the room!

A moist potpourri is not attractive to the eye; therefore, an opaque rose jar with or without a perforated lid is appropriate. Here is a simple recipe:

Pick rose flowers in the morning with the dew on them. Remove petals, place a layer in a wide-mouthed jar, and cover with "ice cream salt." Then add another layer of petals, another of salt and continue till you have as many layers as you wish. This may take all summer. For each quart of petals, use four tablespoons of ground cloves, two tablespoons each of nutmeg, ginger and cinnamon. Mix thoroughly with these ground spices one teaspoon of liquid myrrh, two tablespoons each of oil of lavender, rose, bergamot, honeysuckle, and three of cloves, and incorporate with the rose petals. This is your base. Now add about two cups mixed dried lavender flowers, leaves of lemon-verbena, lemon basil, sweet marjoram, lemon thyme and additional dried rose petals. Let the potpourri mature for three weeks in a warm room in a tightly closed container, and then fill individual jars three-quarters full. When you wish the scent to permeate a room, especially where there is tobacco smoke, remove lid and shake vigorously.

ROSE VARIETIES

PART I

By Edwin De T. Bechtel

Among horticulturists, the term "variety" is applied to cultivated plants — hybrids and bud mutations. A variety is a group of plants related by descent, but distinguished from other similar groups by characteristics too inconstant or too trivial to entitle the group to recognition as a species. This language is as old as Darwin and Asa Gray. The definition of a species, on the other hand, is much more difficult. It is a category of botanical classification, the determination of which formerly depended on a study of external traits and the form and structure of preserved specimens. Today, such comparative morphology is supplemented, above all, by observations of cell structure under high-powered microscopes which reveal the intricacies of the nuclei, chromosomes, and genes of cells; but, nevertheless, the definition of the term "species" continues to be troublesome, especially in the classification of roses. At most the botanists tend to adopt working empirical classifications and denominate, as species, groups of plants which possess in common one or more characteristics distinguished from other similar groups, with the ability to interbreed and to reproduce their characteristics in their offspring.

In the actual use of names of varieties, horticulturists will probably be greatly aided by the action of the International Horticultural Congress to be held in September, 1952, at London. The Code of Nomenclature proposed for adoption by the Congress is set forth in the May number of the "Journal of the Royal Horticultural Society." If accepted, it will be of infinite advantage to amateurs as well as to experts. The Code would, for example, make the varietal names of roses descriptive and genealogical, and thus intelligent and fascinating. There are, indeed, few pleasures comparable to the pursuit of tracing the genealogy of a rose or in speculating on the limitless possibilities of the future of rose hybridizing. The June number of the magazine of the American Rose Society, which has just arrived, enables one to particularize. It announces the two roses which have won the All-America Rose Awards for 1953. The winners are Chrysler Imperial, a crimson-red hybrid tea, and Ma Perkins, a sparkling coral-shell-pink floribunda or hybrid polyantha. The blooms of the Chrysler Imperial are said to be beautifully formed, having about fifty petals, and will keep remarkably well. It was originated by Dr. Walter E. Lammarts, an accomplished and distinguished hybridizer. The rose had as its parents Mirandy and Charlotte Armstrong, which were All-America winners in earlier years. E. S. Boerner, who is also an accomplished and distinguished rose hybridizer, originated the floribunda, Ma Perkins, by crossing Red Radiance and Fashion. Red Radiance is one of the famous and almost foolproof hybrid teas, and Fashion is a floribunda or hybrid polyantha which made its bow so brilliantly two years ago, when it took the highest honors at the Bagatelle International Competition at Paris.

These roses were given tests in twenty All-America Rose Award trial gardens for two years. Preceding these tests, seven or eight years of planning and actual labor were involved in bringing these roses into being after hybridization and in determining their final selection after planting, observing, sorting, and discarding thousands of seedlings.

On the subject of discarding seedlings and the probable success of hybridizing, figures prove that the chance of securing a good new variety has been as encouragingly low as one to one hundred sixty, and as hopeless as one in over one thousand. For example, there is an instance of the ripening of some six thousand crosses into eighty thousand seeds, from which forty thousand seedlings were grown. These, in turn, were checked, and so many were discarded that only sixteen hundred plants were left. Out of this residuum, six roses were selected and qualified as successful variations.

And now to continue the genealogy of our two All-America winners: Mirandy, one of the parents of Chrysler Imperial, is the daughter of a famous McGredy North of Ireland rose and of Charlotte Armstrong (also one of the parents of the new rose). Charlotte Armstrong is the daughter of Sœur Thérèse and of Crimson Glory.

All of these roses are tetraploids (having 4×7 chromosomes) as compared with the usual cell structure of roses; for they are generally diploid (having 2×7 chromosomes in every cell). Rose cells — and there are millions in a single rose — are made up of nuclei, chromosomes, and genes which are supposed to carry the hereditary characteristics. As the cells of roses mature to a maximum, they divide into two pairs, each containing one half of the chromosomes and genes; and each new cell as it develops receives one of the equal parts. In plant reproduction, one half of the diploid chromosomes or seven, or one half of the tetraploid chromosomes or fourteen, go to the feminine seed-producing pistil of the rose and one-half to the masculine pollen members; for the rose is an hermaphrodite. When the pollen of one rose variety is transferred in hybridization to the pistil of another rose, there is a union of the chromosomes by the combining of the pollen (stamen) and seed producing (pistil) cells, if the crossing is fertile. This union restores chromosomes to the original diploid or tetra-

ploid number. Roses, in general, do their fractions and accounting very well indeed. It is sometimes found, however, that the use of the alkaloid, *colchicene,* stimulates the fertility of chromosomes and increases their number. The use of other drugs as well as radiation also stimulates the chromosomes. Plants having such chromosomes are apt to behave in unusual ways. Artificial aids to hybridization thus give promise of a new technique of rose breeding and culture.

And now — to return to our new rose, Chrysler Imperial. The grandparent, Sœur Thérèse, is the daughter of Souvenier de Claudius Pernet, one of the yellow Pernetiana roses derived out of the famous Soleil d'Or, which was the first Pernetiana rose originated by Pernet-Ducher in 1900. That origination is responsible for the variegated colors of our modern hybrid teas, even including our rose Peace or Mme. A. Meillande, as Peace is called in France.

The other grandparent of Sœur Thérèse, however, is an unknown seedling. Crimson Glory, another grandparent of our new rose, Chrysler Imperial, is a descendant through a complicated line, and by way of the famous hybrid tea, Liberty, goes back to the great roses, Mme. Victor Verdier, Général Jacqueminot and Lady Mary Fitzwilliam. But the line is frequently broken by the crossing of an unknown seedling.

Genealogically the other All-America winner, Ma Perkins, the daughter of Fashion and Red Radiance, has Pinocchio and Crimson Glory as antecedents on the one hand, and Radiance, Mme. Caroline Testout, Lady Mary Fitzwilliam and Liberty on the other. But the lines of our pedigrees are broken again and again by the crossing of the inevitable unknown or unnamed seedlings.

And then, in turn, back of all these ancestors are the many varieties which developed and flourished throughout the nineteenth century: (1) the earliest Gallica hybrids, (2) the Bengal or China hybrids, (3) the Bourbon hybrids, (4) the Portland or Damask perpetual types, (5) the tea roses, and (6) the hybrid perpetuals.

All these roses I have mentioned are varieties.

And now let us examine a few rose generations directly out of species roses. A beautiful American species is *Rosa setigera,* with its curving lyre-shaped branches and its delicate pink to cream color blooms, which cover the bushes with clusters in late July and August. This is one of the twenty-five American species. *Rosa setigera* was crossed with *Rosa foetida,* the Austrian Copper rose, and produced Doubloons, which is a large-flowered climber with very large double-cupped, fragrant, rich golden clusters of flowers. Another hybridization of *Rosa setigera* was successful over one hundred years ago when Feast originated Baltimore Belle, a famous old rose which has very double, fragrant, pale blush to rose-white clustered blooms. Another origination by Feast was Queen of the Prairies. Both resulted from the crossing of *Rosa setigera* with *Rosa gallica,* a most flirtatious and lovely species rose, prolific in hybrid form.

Interesting experiments have been made at Canadian agricultural experiment stations in an attempt to cross *Rosa setigera* with some of the indigenous, rugged and winter-hardy Canadian rose species, with the hope of producing a rose to withstand the frigid weather of northwestern Canada. For this purpose, another species rose, *Rosa rugosa rubra,* has been tried out in the United States and Canada without very much success in producing a type of super-hardy rose. On the other hand, American hybridizers have been extraordinarily successful in originating varied types of beautiful Rugosa hybrids which are very vigorous in our latitude. They include such favorites as Agnes, Stella Polaris, the silvery pink Conrad Ferdinand Meyer, its tall white sport, Nova Zembla, and Dr. Van Fleet's hybrids, including his rose-pink Sarah Van Fleet. Indeed, Dr. Van Fleet was responsible for more than twenty-five successful originations out of *Rosa rugosa* species, *Rosa Wichuraiana,* etc. Among the American hybridizers who have used these species with great success are Horvath, the Brownells, Bowditch, and others.

And thus we might attempt to follow interesting crossings and intricate genealogical ascents and descents almost indefinitely; for hybridization, which began as a natural crossing of species, has been carried on intricately and often hectically since Dupont made his first experiments in Josephine's garden. Of course, the rose species are a widely distributed genus, extending through the northern hemisphere as far south as Mexico on our continent, in Africa as far south as Abyssinia, and in Asia to southern India. The age and distribution, the habit and characteristics of this genus are responsible for the fact, acknowledged again and again by the botanists, that there is no botanical genus, the number and characteristics of whose species are so difficult to determine.

EDITORIAL NOTE — Part II of Mr. Bechtel's talk, which was the principal address at the Tenth Annual Rose-Growers' Day of The New York Botanical Garden, will appear in the September-October number.

BOTANY (from page 106)

white potatoes are underground stems. Kohlrabi is a swollen stem which appears above ground.

We rarely consider the fact that we are eating flowers when we enjoy broccoli, but the edible portion of the plant is an inflorescence. Cauliflower likewise is an immature inflorescence, while artichokes, members of the composite family, are also flowers and the edible portion consists of bracts surrounding the inflorescence.

We eat the entire fruit of such plants as summer squash, string beans, okra, corn and tomatoes, but only a portion of the ovary wall in cherries, peaches, avocadoes and olives. In the citrus fruit, succulent hairs on the inner surface of the ovary wall supply the juice we enjoy. The only edible portion of the banana is the placenta that bears the small black abortive seeds, and the red flesh of the watermelon is likewise placental tissue. We eat the seeds alone of such plants as lima beans, shell beans, peas and the peanut.

Dr. David Fairchild wrote two very enjoyable books which he entitled THE WORLD WAS MY GARDEN and THE WORLD GROWS 'ROUND MY DOOR. How well these two titles apply to your grocery store! Not only the geographical world, but the plant world as well is represented on the shelves of the grocery store.

For the Younger Generation of Gardeners

Monarch of All He Surveys

By **Edith F. Johnston**

WHERE do all those lazy orange-and-black butterflies go as they drift along the coasts of Long Island and New Jersey from early September till frost?

Watch them for a long time and you will see that all float in one direction, in the long run. Once in a while you will see an individual butterfly, or a pair, turn backward, swoop low over the water, rise high and flutter about one another, playing tag in the air and seeming to go counter to the direction of the swarm, but before they have gone far they will turn back and resume their lazy drift toward an unknown meeting-place, regardless of the direction of wind or tide. What butterflies are they and where are they going?

"Monarch" is the name of this handsome creature. His Latin name is *Anosia plexippus*. He is probably the best-known butterfly in the United States because of his large size, striking color and abundance. Also, he is one of the easiest butterflies to catch, because of his quiet leisurely manner of flight. We are told that birds do not like the monarch's taste, so they leave him alone and he is not forced to cultivate darting and fluttering tactics to keep from being eaten.

The monarch is a large butterfly with a wing-spread of three to four inches. In color he is a rich brownish orange, veined and bordered with black and spotted with tiny dots of white and larger ones of pinkish buff. The male has a brush of long hairs t the tip of the abdomen. He has scent-pouches, too, on his hind wings, with a faint, faint perfume like that of potato flowers. But you will never notice his scent-pouches until you begin to study him under the magnifying glass.

Wherever milkweed grows, there you will find the monarch butterfly, because milkweed is the food plant of the monarch caterpillars. In the northern states you will find the eggs, larvae (which you probably call "worms"), or chrysalids on the large coarse pinkish-flowered milkweed *(Asclepias syriaca)*, merely because that is the commonest milkweed there, but in Florida and other southern states other milkweeds serve as well, from the great green-flowered milkweed to the delicate slender lanceolate milkweed with its sparse red-orange bloom.

The female monarch lays her eggs one by one on the backs of the milkweed leaves, close to the jutting veins. To the unaided eye they are about the size of a pinhead and pale cream color. But under the magnifying glass they look like little blunt sugar-loaves, about one-twentieth of an inch high, of a very pale yellow-green. If you can find a microscope to use to study them more closely, you will find that the pale glistening surface is fretted with twenty-two shallow lengthwise ridges, with straight fine cross-lines between. On top is a tiny rosette of the most exquisitely delicate workmanship.

After a few days, the number depending on the heat of the weather, the little sculptured egg hatches into a tiny pale green caterpillar covered with almost invisible down. Once out of the shell he loses no time but bites a tiny hole in the leaf and begins his larval career of incessant eating, broken only by short rest periods before and after his four or five moults. These "moults" are changes of skin, when the old skin, grown too tight with constant feeding, is shed like winter underwear and replaced by a new suit of the very same pattern but larger dimensions. Very early in the caterpillar's life his characteristic black crosswise stripes begin to show. With each moult the colors become livelier until in its final larval form the monarch caterpillar is a striking creature two inches long, with crosswise stripes of black, white, and yellow, pale orange or pale yellow-green. In front he shows two long waving black filaments. While feeding he twitches and waves these appendages, as if he were using them as organs of touch. At the rear he has two short black filaments which are immovable.

Now he is ready to hang himself up and become a chrysalis. He has lost his ravenous appetite. Food, heretofore the one passion of his life, no longer interests him. He just sits and meditates.

At this time he may be seized with an uncontrollable *wanderlust,* leave his food plant, and run about as if wildly seeking a better situation for his long sleep. This is the stage at which you will see this showy caterpillar running along the roadway, regardless of predatory birds, mantids, toads, human feet, and cars. If you are keeping him in a covered glass jar, he is more likely to run up and down for a bit and then sit passively, awaiting the next impulse of instinct. Probably this long pause is to allow time for all the last food he has consumed to digest.

After considerable pondering he begins to spin the little button of silk from which he will suspend himself, while he changes to his pupal state and lets the chrysalis form around him. When he is in a glass jar with a cardboard lid, he starts operations by sealing the lid all around with his fine white silk. Then, in the center, he makes either a flat pad or a small convex disk, or a tiny pearl of shining white silk which he pulls out of his mouth and in which he will entangle the hooked claws of his hind segment.

I watched a caterpillar forming his pearl-like support. When it had attained some size, he would press it with his jaws as if forming it into shape. Then he would add more silk and again hold it in his mouth, over and over. At last it seemed to suit him. He reversed his position and pressed his tail, very hard, against the pad. Then a long spell of quiet, followed by strong efforts to fasten his hind claws in the pearl. After half an hour's labor, he seemed to have made himself fast enough. Then there was a long wait, presumably for the silk to harden about his claws.

Next, with every appearance of caution, he let go with one pair of feet; then another. He waited again. Then

he loosened the third pair of feet and was held by prolegs and tail only. (Prolegs, you know, are those fattish legs that support the caterpillar's abdominal segments. The six true legs are joined to the thorax, the part that comes just after the head.) Carefully he loosened the grip of the forward pair of prolegs. No! No! That would never do! He was not secure enough. He renewed the grip of the forward prolegs and waited a while longer. Finally, after many false starts, he seemed to feel that he was safely anchored. He let go with the last pair of prolegs and hung by the *cremaster* alone (the cord by which he dangles). The front end of his body was curled up like a hook. In this position he remained for about twelve hours—some caterpillars take a longer, some a shorter time — while the body fluids moved downward by force of gravity and the forward segments became full and swollen.

Early next morning he started vigorous contortions to rid himself of his last larval skin. He spent nearly an hour bending and straining, as if he were consciously trying to split the skin over head and shoulders. The black filaments at shoulder and haunch began to shrivel and curl. All at once the skin split over the face. The caterpillar abandoned his fish-hook posture, straightened out vertically, and began a series of slow powerful contractions, forcing the skin toward the tail. Within five minutes, it had been worked up to the tail and cast off.

The fresh shining pupa was long, like the caterpillar, but with plain indications of wings and thorax. It was a bright clear green in color, with its larval bands of yellow — but not the black — still plain to see. It began a series of some thirty violent gyrations, to what end the caterpillar alone knew. Some put great effort into this part of their transformation, some very little. The silken cord that held it was twisted three or four times one way, then three or four times in the opposite direction. After this there were slight movements for another thirty to forty minutes, while the pupa grew steadily shorter and more compact. Gradually the yellow bands vanished, the green became less yellow and took on a sleek jade-like hue and gloss. Not until the following day did the golden dots appear which have given the name "chrysalid" — like gold — to all such pupae.

Now he hangs motionless, though if you touch him gently he may squirm a bit. Touch him very gently, though; if you pinch him he will die. This is a critical time in his life, the time of which Emily Dickinson said:

> "What awful changes in the worm
> Produce the butterfly."

After five to fourteen days, according to the heat of the weather, the chrysalis begins to darken, showing

The Monarch butterfly in various stages of development on milkweed, its favorite food plant.

cloudy purple through its cellophane envelope. Now watch it constantly, for in a matter of hours the butterfly will emerge. It grows blacker and blacker. Steel-blue highlights show where swelling wing-edges are pressing against the case. Streaks of deep orange wing begin to show through. Suddenly the cellophane-like covering cracks and out crawls the butterfly. Its wings are short, damp and crumpled. It crawls up and clings to the empty case or to the twig so that the wings may hang straight down as they unfold. If they cannot hang so that they have the benefit of gravity to help pull them straight, they will never unfold properly but will be distorted and incapable of flight, so be sure to give your developing chrysalid a twig for the butterfly to cling to while he dries.

As the stumpy wings hang down, the body fluids flow through them and they lengthen rapidly. Gradually they grow wider, too. At one point the thin wing-membrane seems to expand faster than the stout veins, giving a blistered effect — but don't touch! All will come right. The hind wings are first to reach full size. Finally both pairs of wings are fully expanded. Growth is complete. The monarch rests an hour, or several hours, while the tissues harden, and then flaps away.

All summer the monarch butterflies are busy over fields and swamps, playing together, laying their eggs on milkweed leaves, sipping nectar from thistles, boneset and Jo-Pye, or just luxuriating in the warm air-currents.

But when September comes the monarchs begin to drift toward the seacoast. Like so many of the birds, these butterflies migrate in winter. Nobody knows how successful their migrations are. Some have been observed far out at sea, but do they really fly far enough to reach other lands? Do they hitch-hike on passing ships, or do they stow away in egg or caterpillar form on cargo-boats? You cannot say "What do they think they're doing?" because it is doubtful if butterflies think at all. They are moved entirely by instinct. Whatever makes them do so, monarch butterflies do gather in great swarms along the seacoast in late fall and prepare to migrate out across the water. On the New Jersey and Long Island coasts, I have seen small trees and bushes in late autumn so covered with monarch butterflies that they seem to be reclothed in full leafage of a rich red-brown instead of summer's green.

But no matter how the monarch may travel, he does turn up in foreign lands in increasing numbers. Wherever milkweed gains a foothold, there the monarch will make his home. A hundred years ago, in the years 1845 to 1850, the common wilkweed had been started in the Hawaiian Islands, two thousand miles from America. It had liked the climate and had increased and multiplied until it had become a troublesome weed. Before that, the monarch butterfly had never been known there, but with the spread of the milkweed the monarch began to appear. Now he is found in great numbers throughout the whole area of the

South Sea Islands; in fact, he has become more numerous there than the native forms. In 1857 he was found for the first time in the Caroline Islands, about two thousand miles from the Hawaiian Islands, after milkweed seed had flown there and taken possession.

Look at a map and see where Australia and New Zealand are — about as far as possible from North America. But there, too, the milkweed has gained a foothold, and there the monarch butterfly has become naturalized. Can you find Tasmania on your map — one of the last outposts of habitable land? There it is, away down in the Antarctic Ocean, on the way to the South Pole. Even there, in the vicinity of Hobart Town, the migratory monarch has made himself quite at home.

It is possible to see how the monarch butterfly could migrate from the coast of North Carolina over to Bermuda, a matter of five hundred eighty miles. The first specimens might have been blown by favoring winds or have come there as eggs or chrysalids hanging on some sort of vegetable material carried on boats. With milkweed already established there, the rest was easy.

It is simple enough, too, to figure out how the first monarch butterfly arrived in England and in continental Europe, in Gibraltar and Portugal. But it does tax the imagination to think how he could have reached Tasmania, the Celebes and far-off Java. Yet there the milkweed grows, and there the monarch butterfly flourishes, monarch of all he surveys.

HORTICULTURAL COMMENTARY (from p. 110)

grower with a tremendous sense of the importance of attention to detail. Every evening his exhibition celery was sprayed with dilute soot water, chrysanthemums received similar treatment regularly and indoor cucumbers were sprayed both with soot water and with dilute liquid manure. The results were apparent — foliage took on a lustrous deep green, almost black, appearance, growth was vigorous, stems firm. These plants received every other timely attention, of course, but the foliar feeding gave them one more boost.

Fifteen years ago, too, foliar feeding was practised at The New York Botanical Garden. The indoor chrysanthemums were daily sprayed with soot water. The practice was empirical. It was done because I had done it elsewhere with good results, and because it gave good results here. There was no scientific evidence to support the worth of spraying foliage with dilute fertilizers; the reverse rather was true. I am glad that once again an old gardening practice has been vindicated by modern research.

More About Alfred Unger

In response to my recent commentaries on the Boehmer catalogs, I received a letter from Charles H. Curtis in which he says, "I met Unger on several occasions as he used to call at 'The Gardeners' Chronicle' office in England. He was a big, burly, good looking and humorous person who could tell stories of his wanderings in the Far East and in Japan." Curtis goes on to say that he (Curtis) once possessed a large collection of old catalogs but that these were unfortunately disposed of as waste paper by a lady who did not appreciate their value. Mr. Curtis continues, "My little collection of cool orchids, my garden and my books keep me interested and busy. I have complete sets of 'The Orchid Review,' 'Botanical Register,' Paxton's 'Magazine of Botany,' Maund's 'Botanic Garden,' The Orchid Album and Reichenbachia, besides both of Parkinson's books, the rare Warner's Monograph of Odontoglossum, exquisitely bound; Miller's Dictionary, and the only books ever published on The Ivy and The Pansy, and Salter's book on The Chrysanthemum. I still keep the books I won as prizes at Kew, including Treasury of Botany, Hooker's Student's Flora and Smith's Economic Plants. Including lots of small books, my library must now consist of nearly two thousand volumes.

"Royal Horticultural Society Committees, United Horticultural Benefit and Provident, London's Royal Benevolent Institution, the new Amateur Orchid Growers' Association and our local society occupy a good deal of time, but, at 83, my physical energy is not inexhaustible. However, I keep fairly well and my wife is a tower of strength."

KEEPING IT GREEN (from page 98)

tasks, summer is the season when the lawn should require less care. The grass grows slowly in hot weather and a minimum amount of cutting is required. Occasionally, watering or insect control treatments are necessary. Controlling weeds such as crabgrass is usually the biggest task. However, this pest should give little trouble if the lawn is kept vigorous and the crabgrass plants are prevented from producing seed.

It is very important that the necessary maintenance is done properly. The following basic factors require consideration:

(1) The lawn should not be cut closer than 1½ inches, especially if weeds or drought are a problem.

(2) Avoid watering unnecessarily.

(3) Use an insecticide such as DDT or chlordan if Japanese beetles appear numerous on the lawn.

(4) Plan in advance to give proper care to liming, fertilizing, and reseeding during the cool seasons. This will help maintain a good lawn cover that can withstand future summers.

The lawn provides a protection against soil erosion, and also gives a clean surface for outdoor activities. More than this, it beautifies the landscape and makes home a more pleasant place for summer living.

In Memoriam

GUNTHER K. ACKERMAN

Gunther K. Ackerman entered the employ of The New York Botanical Garden on January 1, 1900. He died May 12, 1952 at the age of 70 years, with over 52 years of completed service; thus, his employment extended almost over the entire history of the Garden. Mr. Ackerman had the gift of endearing himself to all who were so fortunate as to come in contact with him. His genial personality and kindly friendliness were a great asset in winning friends for the Garden among the public with whom by reason of his assigned duties he came in daily and frequent contact. These same qualities were equally appreciated by all his associates, who held him in the highest esteem.

We desire at this meeting to express our sense of the value of the service rendered by Mr. Ackerman and our appreciation of his character which symbolized so clearly the best attributes of a faithful employee.

Resolution adopted at the annual meeting of the Corporation of The New York Botanical Garden, held May 15, 1952.

BOOK REVIEWS

THE GEOGRAPHY OF HUNGER. Josue de Castro. 337 pages, foreword by Lord Boyd-Orr; indexed. Little, Brown & Co., Boston, Mass. 1952. $4.50.

THE GEOGRAPHY OF HUNGER is a thought-provoking book because it contains so much varied material and because the author's point of view differs in many respects from that expressed in many of the recent books on food and population. The chapter headings include The Taboo of Hunger, The Gamut of Hunger, Hunger in the New World, Hunger in Ancient Asia, Hunger in the Dark Continent, Starving Europe, The Advance Against Hunger and Geography of Abundance. There is a bibliography of fourteen pages and an index.

Dr. de Castro is no supporter of Malthus. He considers hunger the cause of over-population, not its result, and hunger to be largely caused by political factors, chiefly colonial exploitation of one type or another, rather than ignorance, and the hard facts of food production and biological reproduction. He is an optimist in believing the ability of the earth to support an increasing population is almost unlimited. However, to assert that the soil has no absolute productive limits and to quote Hanson — "it is never a land that is overpopulated in terms of inhabitants per square mile; it is always an economy in terms of inhabitants per square meal" does not contribute to clear thinking in this field. The skeptic would like a more critical examination of the basis for some of his conclusions but even for the skeptic the book will prove to be a stimulating irritant.

W. J. ROBBINS

THE MOLDS AND MAN. An Introduction to the Fungi. Clyde M. Christensen. 244 pages, illustrated, indexed. University of Minnesota Press, Minneapolis, Minn. 1951. $4.

Increasingly in this age of fungi the mycologist is besieged by interested laymen clamoring for basic information on the fungi, how they grow, what they can do and in particular what they will do to him. Dr. Christensen's sprightly introduction to the fungi provides a ready-made answer to these queries. He has summarized what might be referred to as the glamorous aspects of mycology in an engaging and, at times, penetrating manner. There are statements here which may cause some raised eyebrows amongst the author's scientific colleagues, and at times the approach is more flippant than scholarly, but who would quibble at such minor points when so much interesting and useful information is packed into two hundred-odd pages? This is no prosaic synopsis of the moldy details of industrial mycology, but a lightly drawn account of the biologic activities of molds and their impact on human culture. The author loses no opportunity to propagandize for more and better research in the fundamentals of his subject, and his pithy comments on this matter would alone justify the work as required reading for the neophyte.

As Dr. Christensen approaches the subject of fungus classification, the reader's interest may wane upon encountering such gems as: "all Ascomycetes produce ascospores and any fungus that produces ascospores is an Ascomycetes." To this reviewer the outline of fungal classification presented here appears superficial, overly simplified and outmoded. It contributes nothing to the preceding account and will not clarify the existing confusion or provide the student with an insight into the need and purpose for a usable classification. Omitted, this chapter would not have been missed.

In the hands of student or layman this book may well excite greater interest in the fungi than a dozen more labored and scholarly treatises.

VICTOR M. CUTTER, JR.
Osborn Botanical Laboratory
Yale University

MODERN GARDENING. P. P. Pirone. 371 pages, indexed. Simon & Schuster, New York. 1952. $3.50.

Home gardeners and commercial farmers during the past several years have been confused by the rapid developments in the field of agricultural insecticides, fungicides, herbicides and fertilizers. There have been so many new products placed on the market and such fantastic claims made for them that gardeners and farmers alike have felt uncertain about the what, why and wherefores of these new chemicals.

MODERN GARDENING is the complete reference guide for the farmer and the gardener in their quest for answers in this modern age of agricultural chemicals. Dr. Pirone, an outstanding authority in this field and one of America's best known plant pathologists, has, in this well-written publication, compiled a vast amount of fundamental reference material.

The book is also valuable in that Dr. Pirone has discussed by name these new chemical preparations and has told how they can be used most effectively so as to give maximum benefit to the home gardener and farmer. This practical information, together with a special section which answers over five hundred of the commonly asked garden questions, makes the book a "must" for every gardener's library. The title, MODERN GARDENING, is the best description of the contents of the book. It's gardening in the modern way.

PHILLIP ALAMPI
WJZ Farm & Garden
Radio-TV Director

ELEMENTS OF PLANT PROTECTION. Louis Pyenson. 538 pages, illustrations (line drawings by Emily B. Steffens), indexed. John Wiley & Sons, Inc., New York. 1951. $4.96.

This book is concerned with the biology and control of various plant pests. It not only discusses insect and mite pests, and the fungi and other organisms that cause plant diseases, but also includes sections on rodents, birds, weeds, and mechanical devices used in control operations. The book is designed primarily to serve as a text-book for the teaching of plant protection subjects in the field of vocational agriculture. It should also be of interest to anyone who may desire a concise, readable, and authoritative account of the subject. In effect, the book deals with the elements of entomology, plant pathology, economic zoology, and weed control. Individual subjects are of necessity treated briefly, but the author has compressed an amazing amount of pertinent, practical, and up-to-date information on this vast field within the confines of one volume. The book is not primarily a source of information on control measures for specific pests. It contains much such information, but it is concerned more with principles — of providing students and others with the scientific and practical background needed for an intelligent approach to the control of plant pests. The author includes an excellent series of questions at the end of each chapter. He also makes effective use of circular diagrams to illustrate life histories of pests. These two features should appeal to those who may use this book as a text.

P. J. CHAPMAN
Head, Division of Entomology
New York State Agricultural
Experiment Station

TREES FOR AMERICAN GARDENS. Donald Wyman. 376 pages, illustrated, indexed. Macmillan, New York. 1951. $7.50.

Dr. Wyman's companion volume to his much-used SHRUBS AND VINES FOR AMERICAN GARDENS shows the same care in assembling the information which characterized the first book. While many of the taxonomic pitfalls are avoided, the plant descriptions are quite satisfactory and even the specialist might well use the book as a reference. Those less concerned with the technical aspects of species and varieties can gain much through the use of the lists which furnish information about many features of the growth and use of trees. The date of flowering, the value of foliage color, autumnal coloration and suggested uses for many woody plants are all subjects covered by detailed lists. The observations which are part of the descriptions in the "general list of recommended trees" are especially valuable. They should be important to anyone who has need to consider a tree in relation to a specific project.

The only criticism, in the opinion of the reviewer, stems from the scope of the work. To attempt to evaluate and describe all of the major woody plants which can be grown in all the United States and southern Canada is a monumental task — some regions will be covered much more thoroughly than others. However, there are few regional treatments which are half as satisfactory or done with the accuracy of this work.

AUGUST P. BEILMANN
Missouri Botanical Garden Arboretum

NORTH WITH THE SPRING. Edwin Way Teale. 358 pages, illustrated with photographs by the author; indexed. Dodd, Mead & Co., New York. 1951. $5.

Have you ever come north with the spring? If so, probably either via the railroad or in your own car, and in a hurry, along U. S. 1. Spring does not travel like that. Treat yourself to a new kind of journey under the auspices of a man who really knows his way. Mr. Teale's book will stir your blood, stimulate your imagination, and fill you with an ambition to see for yourself all the beauties and wonders so charmingly yet graphically described by a trained naturalist. So fascinatingly told is this escalade from the far-off Everglades to Canada that you breathe in the delicious scents of spring, hear the music of the migrating birds, and add immeasurably to

your knowledge of horticulture and geography. Even the distant stars come into the picture. You learn about air plants, about myriads of unfamiliar birds, about where to seek rare seashells and what really causes the roar of the sea in the familiar conch shell of your childhood. The eerie yowl of the limpkin over the weird byways of the Everglades, the banding of eagles, the coming to roost of thousands of glossy ibis, the wonders of Cross Creek, the little-known wilderness of the Okefenokee and the Suwanee, that river of song which is seen by so few, all of these pass in gorgeous pageantry before your delighted eyes. You find out that floating islands can be something other than items on a bland diet, that the largest and deepest spring in all the world pours out its crystal stream at Makella. Butterflies in their wayward flight flit by, mountain women show you where and how they garner healing herbs for the market, thousands of exquisite trilliums nod to you over Tryon, where the garden clubs guard them from destruction, and overhead the tiny warblers twitter their thin music as you travel along. Every mile is a delight. The tiny flowers of the pixie moss in the New Jersey Pine Barrens smile a welcome. Spring in New England, redolent of lilacs, is a bracer for the languid spirit and atop lofty Mt. Washington the roaring winds blow away the last traces of boredom, if you are bored by having to stay at home. What more can you want or expect for $5.00? Do not miss this book.

LOUISE D. HOLTON
Essex Fells, N. J.

THE HOW AND WHY OF BETTER GARDENING. Laurence Manning. 239 pages, illustrated, indexed. D. Van Nostrand, New York. 1951. $3.

The HOW AND WHY OF BETTER GARDENING fills a void of long standing in American garden literature, coming closer to that requirement uttered by Henry Ward Beecher over half a century ago, that garden writing be "The result of long and close observation and ripe reflection." The author's long association with growing plants as a nurseryman assures confidence in the information.

It was refreshing to turn from the regular how-to-do-it book to one that probes deeper into the mysteries of plant behavior and into the why of the practices associated with plant culture.

The author has shown considerable skill in handling the scientific phases of the subject and bringing out the facts in sprightly language and in terms the lay person can understand. He discusses the plant and the purpose of plant growth, the influences and relations of soil and climate, the functions of leaf, stem, and root, and above all how we influence these functions for better or for worse when we apply the practices of pruning, transplanting, seeding, etc.

Avoiding for the most part attractive theory to adhere largely to known facts, the author may be forgiven if, towards the end, he allows himself to be drawn towards the acid soil theory as a preventative of weeds and disease. This somehow adds, rather than detracts, from an excellent book which in the hands of amateur and advanced gardeners will be consulted frequently as an informational source, for the matter contained herein is fundamental to all we do in all phases of gardening.

PATRICK J. MCKENNA
Horticulturist & Garden Consultant

SUNSET PUBLICATIONS. Lane Publishing Co., San Francisco, Calif. 1951. $1 each.

"Sunset Planting Ideas for Your Southern California Garden" is compiled from ideas published in "Sunset Magazine" and profusely illustrated with photographs, charts and diagrams. All fields of gardening are adequately covered for the gardener who must plan and plant according to the demands of southern California's climate.

Invaluable are the two chapters on camellias. Since camellias have become so popular and the growers' lists so long, the average gardener faces the big problem of selection. Here the best kinds are discussed and rated by western growers.

"Sunset Planting Ideas for Your Northern California Garden" follows the same general idea of the afore-mentioned book on gardening in southern California. Here, again, ideas for planting and growing for best results under specific climatic conditions are fully treated, with lists, charts and illustrations to supplement the text.

A chapter on high-altitude gardening for mountain gardeners fully treats the subject of what and when to plant at higher elevations. All the gardeners who contributed to this chapter have homes with outstanding gardens at elevations over 5,000 feet, and have listed the annuals, perennials, bulbs and shrubs that do best under such conditions.

"Sunset Ideas for Landscaping Your Home" is dedicated to helping home owners obtain more living out of their lots by approaching the problem of landscaping with a carefully worked out plan.

From basic plans, the editors go into constructions for slope control, the planning of garden space on a hillside, and the solution to changing levels; out-of-door dining space and barbecue construction; fencing. Estimated costs for materials used in garden development and types of construction materials are very helpful to the home landscaper.

Ten landscape architects have presented their selections of vines, shrubs and trees for fourteen typical garden problems.

More than two hundred fifty illustrations help to enrich the ideas set forth.

"How to Build Fences and Gates" is another valuable book for home owners. Two hundred and twenty-five pictures of picket, slat, board, solid panel, louver, board and weave, lattice, rail, corral fences, plastic screen, glass, and wire fences help in making a wise selection.

Methods of construction, layouts, materials, preservatives and post holes are treated fully, as well as care and repair of fences once they are erected. Too, the laws governing the placing of fences are explained to the unwary.

"Sunset Vegetable Garden Book" is an important book for anyone growing vegetables in the West.

In the opening chapters the rules for successful growing of vegetables are set forth — soil conditioning, fertilizers, need of moisture in the soil, planting and cultivating, mulching, crop rotation. There is a chapter on planning for variety and a vitamin chart to aid in selecting vegetables most essential to good health.

Each vegetable is discussed, in alphabetical order, as to culture, pests, varieties, and use in the kitchen. Herbs, their cultivation, harvest and use for definite culinary purposes are also listed.

A complete index adds to the value of the book.

VIRGINIA STEWART
San Anselmo, Calif.

ADVANCES IN ENZYMOLOGY. F. F. Nord. Volume II. 417 pages, indexed. Interscience Publishers, New York. 1951. $9.

Volume II of ADVANCES IN ENZYMOLOGY meets the usual high standards of this publication, and maintains its international character. Authors of the nine chapters represent England and Wales, the Netherlands, and Switzerland, as well as this country. Topics covered include an essentially physical-chemical one, "The Nature of Entropy, and its Role in Biochemical Processes," by Herbert Gutfreund, as well as others of biochemical interest, which are not presented from a strictly enzyme point of view: "Reactions at Interfaces in Relation to Biological Problems," by J. F. Danielli and J. T. Davies, and "Thiol Groups of Biological Importance" by E. S. Guzman Barron. The "enzyme" chapters are "Pectic Enzymes" by Hans Lineweaver, and Eugene F. Jansen, "Enzymic Synthesis of Polysaccharides," by Edward S. Hehre,

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and "The Biological Transformation of Starch" by Stanley Peat. Another chapter, by Arthur Stoll and Ewald Seebeck, deals with the antibiotic substance, Alliin, isolated from garlic, and with the enzyme, alliinase. The subject is covered from a historical as well as a chemical viewpoint. Two chapters are of particular interest to the botanical sciences: "Chlorophyll Fluorescence and Photosynthesis," by E. C. Wassink, and "Some Problems of Pathological Wilting in Plants," by Ernst Gaumann.

MARJORIE ANCHEL

BETTER FLOWERS FOR YOUR HOME GARDEN. John Hayes Melady. 162 pages, illustrations by Eva Melady; indexed.

BETTER VEGETABLES FOR YOUR HOME GARDEN. John Hayes Melady. 159 pages, illustrations by Eva Melady; indexed.

BETTER FRUITS FOR YOUR HOME GARDEN. John Hayes Melady. 156 pages, illustrations by Eva Melady; indexed.

BETTER LAWNS FOR YOUR HOME. John Hayes Melady. 130 pages, illustrations by Eva Melady; indexed. Grosset & Dunlap, New York. 1952. $1.50 each; boxed set of four, $5.95.

These four books furnish easily understood information that enables the home gardener not only to beautify his property with lawn and flowers, but to render it useful to the production of vegetables and fruits, through the expert tips on gardening practices, sections on insect pests and diseases, insecticides, plant foods, tools. Diagrams, tables and sketches by the author's well-known artist daughter, Eva, supplement the printed word.

GARDEN HOUSEKEEPING. Mary Deputy Lamson. 167 pages, illustrations by Jessie Robinson; indexed. Oxford University Press, New York. 1951. $3.50.

GARDEN HOUSEKEEPING is a little book, but not one to be read in a hurry. Each page is concentrated with garden advice that needs time to be assimilated. In fact, after reading this book, a new or potential gardener might very well receive the discouraging impression that a gardener's work is never done! An old-hand gardener, of course, realizes that this is essentially true and so will welcome the many helpful hints that the author offers to lighten the load of garden work.

Mrs. Lamson is well known as a landscape architect who has designed many private gardens. But her book, GARDEN HOUSEKEEPING, indicates that she herself has worked in her own garden for many seasons and from her own practical experience has discovered the easiest ways to do gardening in the shortest possible time.

Such down-to-earth subjects as tools, pruning, fertilizers, sprays and labeling are discussed with a view to keeping down both labor and expense. After reading only a chapter or two of this book, one becomes convinced that a definite plan of action is essential if all the tasks are to be accomplished within a certain season. And after completing the book, one cannot help being inspired to follow Mrs. Lamson's specific monthly advice as given in her Garden Housekeeping Calendar.

The book is illustrated with drawings that exemplify information given in the text. Frequent charts help to condense specifications mentioned in long paragraphs and are valuable for quick reference.

ELIZABETH ANN PULLAR
Garden Consultant

AGRICULTURAL CHEMISTRY. Volume Two. Donald E. H. Frear, Editor. 588 pages, illustrated, indexed. D. Van Nostrand Co., New York. 1951. $9.50.

This is the second of two volumes on agricultural chemistry edited by Professor Frear. This volume emphasizes practical applications of chemistry to the field of agriculture, including information on fertilizers, livestock nutrition, pesticides, and inventions and patents.

The text is clearly written, concise and therefore easy reading for those who have some background in inorganic and organic chemistry. It should prove a valuable reference for students and workers in the plant and animal science fields.

GILBERT H. AHLGREN
Rutgers University

THE NEW BOOK OF LILIES. Jan De Graaff. 176 pages, illustrated with drawings and photographs; indexed. M. Barrows & Co., New York. 1951. $3.50.

This latest addition to the growing list of books pertaining to lily culture attests the increasing popularity of the lily as a garden plant. The sixteen magnificent color plates will tempt many casual gardeners to try their luck with lilies rather than regard them as the exclusive property of a relatively few so-called experts. Likewise, Mr. De Graaff's extensive use of personal experiences should encourage these same beginners to try their own ideas on culture rather than adhere to the dogmas of the old master gardeners. The reference chart of species and varieties reveals in a few moments the essential information concerning a given species which can normally be obtained only after perusing several paragraphs of superlatives in similar books.

To the careful reader, trained in science, there are certain ideas and inconsistencies which might well be questioned. Foremost, since it permeates the entire work, is the teleological approach so common to much of the gardening literature. Thus "the search for food," "it tries to produce a flower," and other comments of a similar nature imply the purposeful action of plants. Such dogmatic statements as ". . . I have learned to discount all this advice" (in reference to planting depth) implies that correct information on this subject has never been published previously. The author would also have performed a real service if he had reduced the material on breeding of lilies to a more precise form and statement of fact.

A considered evaluation of this book indicates that it will serve as a useful introduction from whence the novice should proceed to a more serious study of the garden lilies.

R. D. RAPPLEYE
University of Maryland

ALL ABOUT AFRICAN VIOLETS. Montague Free. 304 pages, illustrated, indexed. Doubleday & Co., Garden City, N. Y. 1951. $3.50.

Having had years of experience with African violets, the author has gone through all the many phases of growing and taking care of this popular house plant in his own home. He has had the *once* "most dreaded" mites and has treated his plants, reporting the whole procedure. It is such first-hand information that makes this book so valuable to everyone interested in African violets.

The amateur grower will gain much knowledge from a thorough reading of this book and it will prove a very helpful guide. The advanced collector and hobbyist will be able to use this book to find ready information on any disturbing problem.

There are dozens of photographs which are of infinite value, and the step-by-step photographs of cross-pollination are of special interest to the person who wants to leave the amateur class and try out something more advanced.

ALL ABOUT AFRICAN VIOLETS does live up to its title. It is seldom that we find a subject so thoroughly covered from actual experience.

FLOYD L. JOHNSON, *President*
African Violet Society of America

THE GARDENER'S TROUBLESHOOTER. Victor H. Ries. 320 pages, illustrated, indexed. Sheridan House, New York. 1952. $3.50.

This handy-sized little volume is designed to furnish the answer or the antidote to just about all the ills that plants are heir to in the amateur's garden. The author is horticulturist at Ohio State University and speaks as one having authority. Furthermore, his instructions are clear and direct

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and give the unlearned layman a minimum of bother in finding the host or the nature of the pest or problem for which he seeks help. There is a particularly good sense of values in the order and subject matter of the chapters, beginning with "the effect of soil on your plants" and ending with a forward look toward more concise information for the serious student. There is also, of course, an all-inclusive index. The cartoons by a number of artists are so amusing and apropos that they keep one leafing through the pages on a first examination until the truly helpful nature of the text begins to be quite painlessly absorbed. This is not just another all-about-gardening textbook but something special that might well find a place on every horticultural bookshelf.

MARION CODE, *Librarian*
Pennsylvania Horticultural Society

CORSAGE CRAFT. Glad Reusch and Mary Noble. 148 pages, illustrated, indexed. D. Van Nostrand Co., New York. 1951. $3.

CORSAGE CRAFT, as stated by the authors, is the art of using flowers for personal adornment, and in their book each chapter is presented in such a clear, concise manner that the reader will be able to follow, step by step, not only the mechanical technique of assembling the plant material but the many ways to condition the material which is so very vital in corsage making. Many new and interesting designs are presented and illustrated in such a way that it should be very easy for the reader to comprehend and demonstrate. Both home-grown garden and florist material are used in unusual combinations and designs.

This book, I sincerely feel, is a very valuable addition to every gardener or flower arranger's library. It is a comprehensive handbook of new and exciting uses of garden material. Its scope is wide, as it is filled with information not only for beginners but for the advanced and professional as well. It should serve as a reference book in corsage making for many years and I could not find one question pertinent to this art that the authors had not anticipated and clearly answered.

WYNNE HESCOCK
Mamaroneck, N. Y.

FIELD CROPS. Howard C. Rather and Carter M. Harrison. 446 pages, illustrated, indexed. McGraw-Hill, New York. 2nd edition, 1951. $5.50.

The first edition of this college-level text book, dealing with the theory and practice of crop production and management of the land, appeared in 1942. In its preface Howard C. Rather, the author, acknowledged his indebtedness to Dr. Carter M. Harrison for his "helpful, critical examination of the entire manuscript." Dr. Harrison is reviser and co-author of the second edition. Dr. Rather died in January 1951 shortly after the manuscript of the second edition was completed. The text has been revised to eliminate outmoded practices in the growing of farm crops and to bring it up to date on disease and insect control, fertilizers, crop yields and other pertinent information.

WHAT TREE SHALL I PLANT? August P. Beilmann. 44 pages, 48 photographs. Volume 31, No. 6, Transactions of the Academy of Science of St. Louis, 4642 Lindell St., St. Louis, Mo. $1.50.

The booklet is essentially a guide describing shade trees, their adaptability and uses in the landscape, based upon their behavior in the Middle West. Deciduous trees from ailanthus to zelkova, found in the Midwest and all common evergreen trees of the area are described. Good points and undesirable features are given. Outstanding characteristics of many trees with respect to leaves, blossoms, fruit, bark, shape and usage are illustrated by photographs. A comprehensive summary is appended.

PAUL E. TILFORD, *Executive Secretary*
National Arborist Association, Inc.

THE RETAIL FLORIST. John H. Liesveld. 393 pages, illustrations. Macmillan, New York. 1951. $5.

Mr. Liesveld's book is certain to be of enormous value to anyone, irrespective of his previous experience or training, who may be thinking of starting or purchasing a retail florist business. It is practical in its approach and comprehensive in its scope. In fact, it offers just about everything one needs to enter the business except capital and first-hand knowledge. And, however one comes by the capital, there is only one way of coming by the first-hand knowledge — namely, as Mr. Liesveld says and as everyone who has had any association with the florist business knows — by serving an apprenticeship as a retail florist.

There is all the information one needs on the social, legal and financial aspects of a florist business; on the physical requirements of a satisfactory retail shop; on business policies, personnel and customer relations, on buying, selling, advertising and merchandising; on the handling of stock and accessories; on packaging, display and window decoration; and on the handling of floral orders for all occasions. The actual art and technique of creating floral arrangements and designs are only briefly dealt with, however, and for fuller instructions in such phases of floristry readers are referred to the numerous available books on the subject and to the floral design schools.

Mr. Liesveld's qualification to write about the retail florist business is attested by the fact that he is the founder and proprietor of the highly successful Liesveld Flower Shop in Kansas City, Missouri.

THEODORE A. WESTON
Editor, Flower Grower

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ERRATA. Inexplicably the wrong page numbers appeared under "Credit for Illustrations" in the May-June issue. The correct pages should read: p. 66, upper left, upper right, lower left, The Conard-Pyle Co.; lower right, Bobbink & Atkins; p. 67, top, Jackson & Perkins; bottom, Roche, Caldwell, N. J.; pp. 68, 69, E. N. Mitchell; p. 71, Gene Baxter—through courtesy A & P Super-Market, Woburn, Mass.; p. 73, Charles E. Kellogg; p. 74, Arthur Palme; p. 75, top, Edgar T. Wherry; bottom, Shirley Briggs—courtesy Dr. Paul Bartsch; p. 76, Charles E. Mohr; pp. 77, 78, Rupert C. Barneby; p. 79, Walter L. Graham; pp. 80, 81, 82, Connecticut Agricultural Experiment Station; p. 85, R. E. Horsey; p. 93, E. N. Mitchell.

NEWS, NOTES and COMMENTS

A fiscal year of The New York Botanical Garden has ended; another has begun. In these pages, we briefly relate accomplishments and reveal new plans.
—Editor.

Annual Meeting of The New York Botanical Garden. Charles B. Harding, President, in addressing the corporate meeting of The New York Botanical Garden on May 15, said:

"How fitting it is that we have our annual meeting in the springtime, as spring is the time of growth. Here in the Garden we can see growth everywhere — growth in a way that makes this the most attractive time of the year.

"Institutions like ours must also grow, if they are to justify their existence and do the things that make them worthwhile. They must do this not only in the spring but twelve months a year. I am glad to say that we belong to a growing institution.

"Through the generosity of two members of the Board of Managers and with help from the City of New York, we have completed plans for the restoration of the Snuff Mill, which will give us a restaurant with a terrace on the bank of the Bronx River....

"We have plans for a new laboratory to be located on the grounds at the back of the Museum Building. We estimate that the total cost of the building and equipment will be about $1,000,000. We have $500,000 on hand or pledged and must raise the additional $500,000 before the end of this year, if we are to receive the $150,000 the City has allocated for this purpose....

"The City is now replacing Boulder Bridge over the Bronx River....

"Contracts will be let in the next six weeks for the repair and remodeling of our greenhouses....

"All of these things that we have done and are going to do are the result of the wonderful cooperation and help of our many friends ... the Board of Managers, the Advisory Council, the Volunteer Associates, our members, the City of New York, and Robert Moses, Commissioner of Parks, and his associates...."

Dr. William J. Robbins, in his annual report as Director, presented facts and figures to illustrate the number of hours spent by staff members in conducting the responsibilities and operations of their respective departments. He cited specific examples demonstrating that "a staff member does not lead a cloistered life devoted to the leisurely pursuit of his special interest, to the enjoyment of the beauty of our grounds, to the delights of our Library. Each participates according to his special training and abilities in the housekeeping of our grounds, buildings and plant collections, in service to the public by lectures and consultation, in preparing flower shows and displays, in editing our publications; in short, in making The New York Botanical Garden a place of education and of pleasant resort for the public and one in which botanical and horticultural knowledge is preserved and disseminated."

Dr. Robbins continued, "There is an additional responsibility ... to add new knowledge about plants to that which already exists. One of the major research objectives of The New York Botanical Garden since its establishment has been to increase our knowledge of the kinds of plants. One out of every seventy of the three hundred fifty thousand kinds now known has been named or described by members of the staff of this institution, and we estimate that there are no less than one hundred fifty thousand kinds of plants still to be discovered and described and made known to science. To find and describe these plants is part of the responsibility of our taxonomic staff....

"We have been concerned for some years with an investigation of the anti-bacterial substances produced by a group of fungi, the Basidiomycetes. We are interested in the therapeutic activity of these substances.... We are also interested in the relation between the chemical structure of these compounds and their biological activity. With the support of a grant from the National Institute of Health, we are studying these questions. Another project upon which we have been at work for the past five years is the search for antiviral substances...."

Mr. Harding presented six Distinguished Service Awards. Arthur M. Anderson, member of the Board of Managers since 1933 and Treasurer since 1938, received the award for demonstrating the ways in which a citizen, in a private capacity, may render public service. The award to Dr. Liberty Hyde Bailey was in acknowledgment of his outstanding career as educator, administrator and botanical investigator.

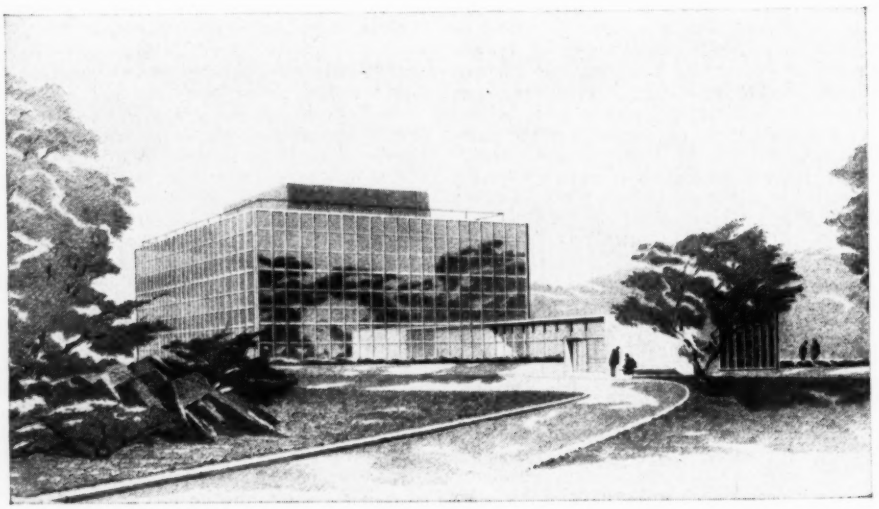
The citation for exhibits of broad educational and artistic value, arranged in the Museum Building of The New York Botanical Garden, was awarded to Mrs. Charles Burlingham; while Mrs. Beatrix C. Farrand, pre-eminent among landscape architects, received the meritorious award for her service to The New York Botanical Garden through the design of its Rose Garden.

C. Suydam Cutting, skilled explorer of the less accessible parts of the world, was cited for his service to science through The New York Botanical Garden. The botanical collections assembled on his exploration in 1939 of Upper Burma, in company with Arthur Vernay and Captain F. Kingdon-Ward, are deposited in our Herbarium.

Dr. Elmer D. Merrill, Director of The New York Botanical Garden from January 1930 until he was called in 1935 to become Administrator of Botanical Collections and Director of the Arnold Arboretum, received the Distinguished Service Award in grateful appreciation of his qualities as a scientist and for his public service.

The first presentation of the trophy of the Sarah Gildersleeve Fife Memorial Fund was made to Dr. Bassett Maguire, Curator of The New York Botanical Garden, in recognition of his many explorations in Venezuela. Mrs. William Davis Miller of Wakefield, R. I., Chairman of the Fund, presented the large silver bowl to Dr. Maguire. Dr. Maguire showed some impressive kodachromes taken on his six months' exploration in Venezuela and British Guiana, from which he had returned the first of May. Actually, there were three separate expeditions. The first was to the Pakaraima Mountains, British Guiana, in collaboration with the British Guiana Forest Department, headed by D. B. Fanshawe, then Acting Conservator of Forests. This expedition occupied about two months. The second expedition was that of The New York Botanical Garden to Cerro Guaiquinima in upper Rio Paraguay, which covered a period of two and a half months. On the third expedition, sponsored by William H. Phelps, Jr., prominent ornithologist and a resident of Caracas, Dr. Maguire spent two months in Ilútepuí in Gran Sabana, the northernmost part of the Roraima Chain along the British Guiana-Venezuelan border. Dr. Maguire brought back between eight thousand and ten thousand specimens.

R. Gordon Wasson was elected Treasurer to succeed Arthur M. Anderson, who will continue to serve as a member of the Board of Managers. All other officers were re-elected. Gilbert H. Montague, Mrs. David Rockefeller, and R. Gordon Wasson were elected to fill vacancies on the Board.



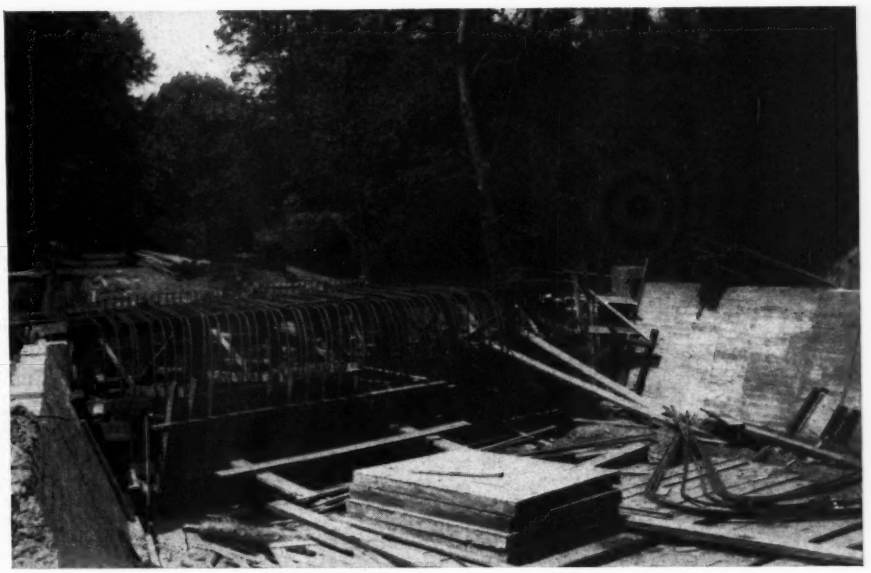
A new scientific laboratory has been proposed for The New York Botanical Garden. From the architectural drawing by the firm of Brown, Lawford and Forbes.

A New Laboratory. "This is the most important single thing that has happened to The New York Botanical Garden in many years," said Charles B. Harding, President, in announcing plans for a new scientific research laboratory for the Garden. The new facilities will allow an expanded research program on nutritional studies, studies on abnormal growths relating to cancer, and studies on antibiotics, and provide opportunity to train young men and women under the direction of Dr. William J. Robbins, Director of The New York Botanical Garden.

Dr. Charles G. King, Scientific Director of the Nutrition Foundation and Professor of Chemistry at Columbia University, is Chairman of the Laboratory Committee of The New York Botanical Garden, of which Dr. Louis O. Kunkel, of the Rockefeller Institute, Dr. Thomas Lewis of S. B. Penick & Co., Harry Parish II, and William Felton Barrett are members.

The "New York Herald Tribune" in an editorial on May 21, stated: "... plant studies have become increasingly important to the medical study of man in recent years. ... Science has come to realize that future discoveries in the physiological and biochemical processes of plants may hold profoundly important solutions for all kinds of problems that affect mankind....

"The New York Botanical Garden is assured through donations already received, or pledged, of one-half of the needed funds. Here is an opportunity for more public-spirited citizens to come forward with support for a project of great significance to all people."



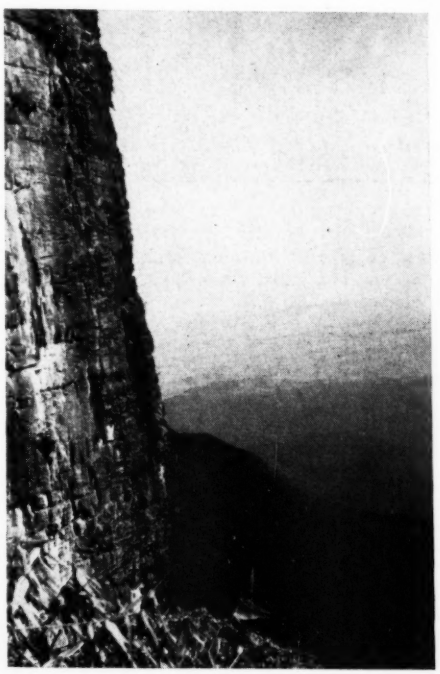
Construction began this spring on the new concrete bridge to replace Boulder Bridge—the work is being done by the City of New York.

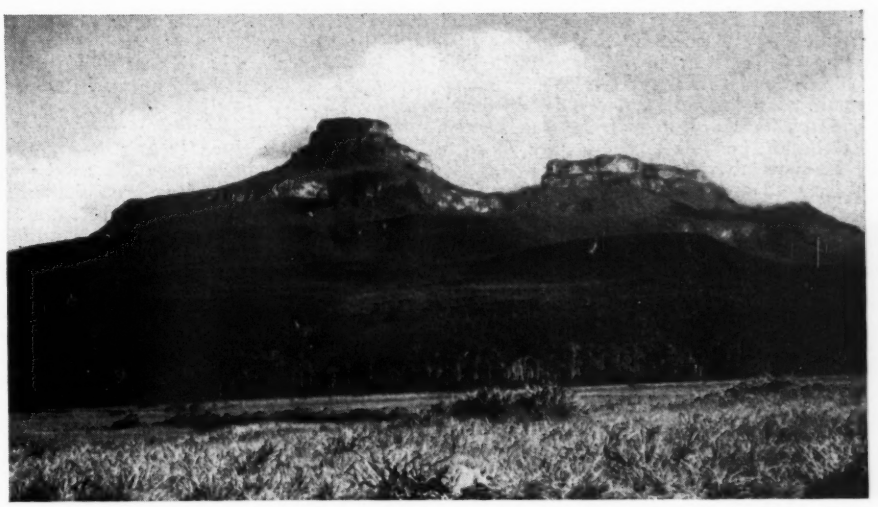
Repairs to Conservatory Range. Major repairs to the Conservatory Range of The New York Botanical Garden have been planned and will be executed during the coming summer and early fall. The plans include the construction of an adequate comfort station on the west side of the building. The indoor lily pond will be rebuilt and the arrangements in the various houses changed to allow for better display of the plants. New heating and plumbing are to be installed and renovations made to portions of the basement of one of the houses. When completed, it is believed that the Conservatory will offer opportunities for greater enjoyment of the permanent as well as the temporary exhibits and provide for floral shows surpassing those of the past.

Theater Benefit. "Don Juan in Hell" was chosen as the play for the Theater Benefit of The New York Botanical Garden, held on April 2, 1952. Under the able leadership of Mrs. Harold Ruckman Mixsell and Mrs. George K. Livermore, Co-chairmen, the benefit again proved an outstanding success. Serving on the committee were Mrs. James Cox Brady, Mrs. Thomas D. Thacher, Mrs. Henry S. Fenimore Cooper, Mrs. James W. Maitland, Mrs. Charles Burlingham, Mrs. Grafton H. Pyne, Mrs. Oakleigh L. Thorne, Mrs. Richard de Wolfe Brixey, Mrs. J. Horton Ijams, and Mrs. Philip B. Weld, all of whose efforts contributed in no small measure to the fine results.

Advisory Council Luncheon. Among the guests at the Annual Advisory Council luncheon, which was held at The New York Botanical Garden on May 21, were representatives of the museums, textile and wallpaper houses, and interior decorators who are cooperating in the exhibition "The Influence of Plant Forms on Design." This exhibition, which opened the day of the luncheon, will continued throughout the summer.

Mrs. Hermann G. Place, Chairman of the Advisory Council, welcomed the guests, and Dr. William J. Robbins, Director of The New York Botanical Garden, gave a very interesting talk on the importance of plants to man.





Above: This is the uppermost cliff of Ilú-tepuí which prevented Dr. Maguire's ascent to the summit. Right: Ilú-tepuí, northernmost plateau-mountain of the Roraima Chain, rises 5,000 feet above the extensive upland savanna at the head of the Kamarang River which flows out of Venezuela into British Guiana. There it joins the Mazaruni in its progress to the Atlantic Ocean.

Reading left to right: Mrs. Thomas D. Thacher, former Chairman of the Advisory Council and member of the Board of Managers of The New York Botanical Garden, Mrs. Hermann G. Place, Chairman of the Advisory Council, and Mrs. Richard Fenby Bausman, Corresponding Secretary of the Advisory Council and Chairman of the luncheon, admire the tree-peonies with which Mrs. Warren Kinney decorated the head table at the Annual Advisory Council Luncheon.

Mrs. Donald B. Straus explains details of the textile exhibition to one of the guests at the annual luncheon of the Advisory Council of The New York Botanical Garden.

The tables were beautifully decorated by Mrs. Warren Kinney with flowers from her garden in New Vernon, N. J. The arrangement on the head table was most unusual, consisting of luscious, deep rose tree-peonies combined with leaves of the peppermint geranium. Around the room were economic plants, orchids, and interesting and unusual geraniums staged by Louis P. Politi, Head Gardener of The New York Botanical Garden.

Museum Exhibits. Photographs by Tet Arnold von Borsig were exhibited during the first two weeks in May. The close-up studies of nature, fascinating in design and detail, are a recent project with Mr. von Borsig, who has a reputation abroad and here for his interpretive photographs of sculpture.

The cooperative exhibition reflecting the influence of plant forms on design, from the medieval ages to the present century, opened on May 21 and will continue throughout the summer. The Cloisters, the Metropolitan Museum of Art, the American Museum of Natural History, the Brooklyn Museum, Museum of the City of New York, and Museum of Modern Art, textile and wallpaper houses, and interior decorators are participating.

Among the fabrics are damasks from the redecorated East and Green Rooms of the White House, shown by Scalamandré Museum of Textiles; brown seed pods in a bold design on linen by Dan Cooper; mushrooms on a linen crash — the design developed by Teresa Kilham from a mushroom exhibit at The New York Botanical Garden.

Perhaps the most exciting among the objects of art exhibited by the Brooklyn Museum are the white and blue resist prints and several eighteenth century wood blocks, the original blocks that were used for printing.

Simple undecorated modern containers, perfect for flower arrangements, are shown by the Museum of Modern Art. This exhibit also includes flower-shaped Tiffany vases of iridescent glass.

How milady dressed in 1830 is effectively portrayed by the Museum of the City of New York. The dress is made of cotton print, probably a French material with a design of flowering plants in color.

Appreciation from Afghanistan. T. H. Everett, Horticulturist, received the following letter, indicative of the international relations of The New York Botanical Garden, from Abdul Razao Ziyaee, Consul for Afghanistan: "We wish to take this opportunity of thanking you for the package which you were so kind to send to us, containing two dozen species of iris consisting of three rhizomes each, which arrived here in good order.

"This package has been sent via air express to His Royal Highness, Prime Minister, Kabul, Afghanistan, and we trust same will reach him during the next few days.

"We have written to His Royal Highness that these bulbs were sent to him with your compliments, and we are quite sure he will get a great deal of pleasure from their growth and beauty."

Librarians Visit The New York Botanical Garden. As part of the program of the annual convention of the Special Libraries Association, held in New York City, May 26-29, seventy-five members of the Biological Sciences Division visited The New York Botanical Garden on the afternoon of May 28. They toured the Garden in "The Floral Flyer," with G. L. Wittrock acting as guide; then were presented by Marjorie Henderson, Librarian of Hoagland Library, College of Medicine, State University of New York, who is the chairman of the Biological Sciences Division, to Dr. William J. Robbins, Director of The New York Botanical Garden, and Miss Elizabeth C. Hall, Librarian. Dr. Robbins, in addressing the guests, explained the purposes and the activities of the Garden. He was followed by T. H. Everett, who gave a talk on "Libraries and Librarians Who Have Helped and Hindered Me." Mr. Everett interspersed the serious portions of his discourse with whimsical remarks and anecdotes drawn from case histories. His audience was most appreciative of his talk and of the beautiful kodachromes of the grounds and special exhibits of The New York Botanical Garden.

Appointments to staff. Richard S. Cowan and John J. Wurdack, upon whom Columbia University conferred the degree of Ph.D. on June 5, have been appointed Assistant Curators of The New York Botanical Garden. They will be members of the staff of the Herbarium, of which Dr. David D. Keck is Head Curator. Dr. Cowan will leave in August for a year's study in England and on the continent, having been awarded a postdoctoral fellowship by the National Science Foundation.

Dr. Arthur Cronquist will join the staff of The New York Botanical Garden on September 1. Recently of the Department of Botany of the State College of Washington at Pullman, Dr. Cronquist has been working for the past year under E.C.A. at Jardin Botanique de l'Etat, Brussels, Belgium, on the flora of the Belgian Congo. George M. Bunting is coming from the Department of Horticulture of Michigan State College, at Lansing, to The New York Botanical Garden as Technical Assistant in the Herbarium.

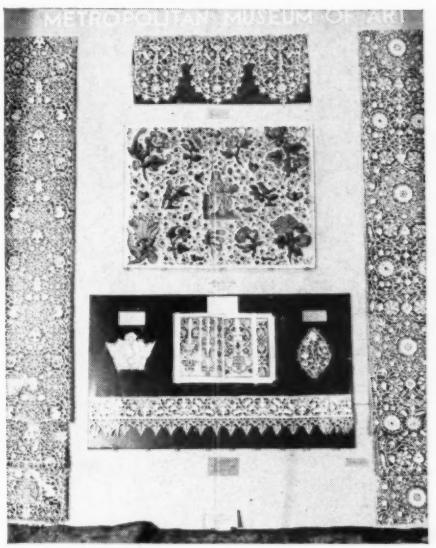
Prof. Arthur Holmgren of Utah State Agricultural College at Logan, will spend the summer at The New York Botanical Garden in order to advance the program of study on the intermountain flora of the western United States, which will eventuate in a Flora of the region to be published by The New York Botanical Garden. Brother Alain has returned to the Garden for the summer under a Guggenheim Fellowship. He has been working in Cuba the past seventeen years with Brother Leon on THE FLORA OF CUBA and has also been teaching at Colegio de la Salle in Havana. The third volume of "The Flora of Cuba" is in preparation.

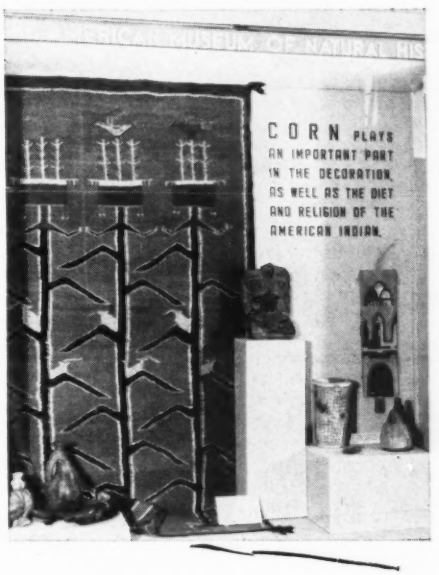
On Radio. During May and June G. L. Wittrock, Assistant Curator of Education at The New York Botanical Garden, appeared on WFUV-FM, the University of the Air, in New York City, a program sponsored by Fordham University. Bob Bohan is director of this particular program.

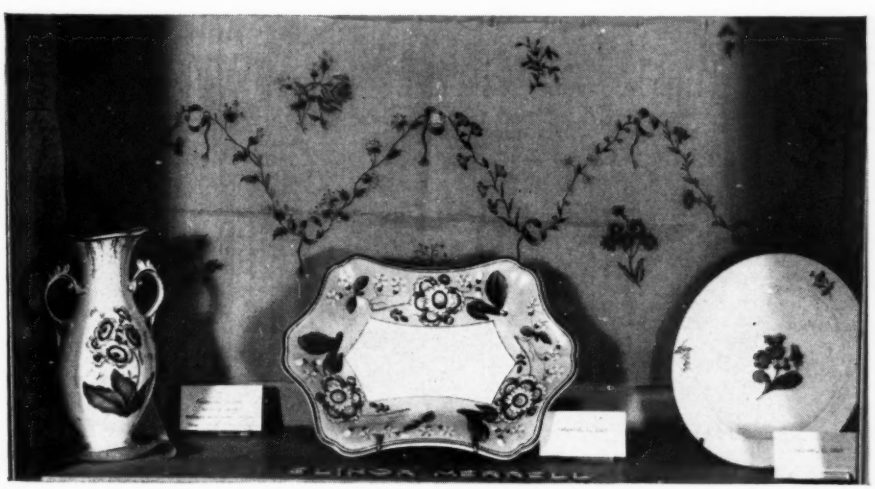
Garden Tours. After a two-day deluge, trees, shrubs, flowers, and lawns had a fresh, clean odor and sparkled in the bright sun that shown on May 27 — the day of the Garden Tours sponsored by the Volunteer Associates of The New York Botanical Garden. Three hundred participated in the tour, thoroughly enjoying the opportunity to visit several beautiful gardens in Westchester County, N. Y.

At "Lounsberry," the estate of Mr. and Mrs. John E. Parsons, Rye, the visitors were impressed with a huge cucumber tree *(Magnolia acuminata)*, probably one of the largest specimens to be seen in the vicinity of New York, and several large pin oaks *(Quercus palustris)*. The forty-year-old flowering crab *(Malus floribunda)* and a grand old white pine *(Pinus strobus)* also attracted their attention. Handsome specimens of *Rosa hugonis* mark the stairway leading to the main flower garden in which the perennial forget-me-not *(Myosotis sylvatica)* is effectively used in the borders.

An extensive cut flower garden and an equally extensive vegetable garden — in the latter are grown some of the finest exhibition vegetables in the New York area — are







Upper left: Thorp illustrates various stages in silk screening. One of the flowers in the effectively designed fabric is the giant Fennel *(Ferula Communis)*.

Upper Right: The objects of art from The Cloisters include a capital from the cloister of the former monastery of St. Guilhem-le-Desert, a rare piece that has not previously been exhibited.

Lower Left: Laces, embroideries and rare fabrics, loaned by the Metropolitan Museum of Art, reflect the influence of plants on design in the Renaissance period.

Lower Right: A red blanket with motif of corn stalks and husks serves as a foil for primitive objects made by North and South American Indians in the exhibit of the American Museum of Natural History.

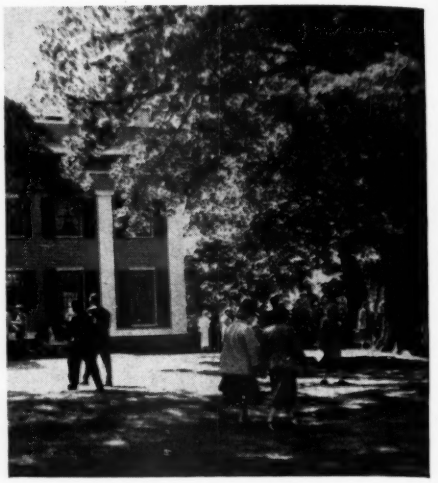
Left: Elinor Merrell displays silk gauze painted with primroses and rare pieces of china with primroses as a decorative motif.

These exhibits may be seen at the exhibition "The Influence of Plant Forms on Design" throughout the summer.

Left: This white-flowered wisteria against the residence of Mr. and Mrs. Arthur M. Anderson at Bedford Hills, N. Y., is a superb specimen.

Right: Rarely does one see such large pin oaks as grace the grounds of "Lounsberry," the estate of Mr. and Mrs. John E. Parsons, at Rye, N. Y.

Below: Magnificent tulips are grown in the formal flower garden at "Brookside" the estate of Mrs. Flagler Matthews at Rye, N. Y.



features of "Brookside," the estate of Mrs. Flagler Matthews, also of Rye. The formal garden is generously planted with superb tulips, which are followed by petunias, lantanas, heliotrope, browallias, verbenas, and other flowers in blue and white.

The terrace of "White Gates Farm," the estate of Mr. and Mrs. Arthur M. Anderson of Bedford Hills, N. Y., opens upon a lawn beyond which an orchard path is visible. Here old apple trees, seventy-five to one hundred years old — some have only partial shells of their trunks left — form a line down the center of the path. Flanked by flower borders and shrubs, the venerable apple trees make a charming picture. Against the mansion there is a pair of magnificent wisterias, one bearing purple and the other white flowers. The white-flowered is, without doubt, one of the finest specimens in this part of the country.

There were several very old tree wisterias and a wisteria-covered pergola in the formal garden at "Penwood," the estate of Mrs. Carll Tucker of Mt. Kisco, N. Y. The flower beds in this old English style garden are edged with boxwood. The natural woodlands in which the gray birch *(Betula populifolia)* figures prominently; the vegetable garden with its espaliered fruit trees — the larger ones are at least forty years old; the avenue of clipped Japanese yew, the many old winged euonymus and the clipped evergreen *Euonymus Fortunei vegetus* growing against the wall of the main house — these are but a few of the many interesting features of this beautiful estate.

Mrs. Donald B. Straus was chairman of the Committee on Arrangements for the Garden Tour.

Visitors pause in the tea house before descending the stairway to the formal garden on the Mrs. Carll Tucker estate at Mt. Kisco, N. Y.

The Garden receives Garden Club of America's Founders' Fund Award. Support of The New York Botanical Garden's horticultural expedition to England and Ireland, in search of plants suitable for American gardens, fulfills three of the major premises of the Garden Club of America's program — in the fields of horticulture, conservation and international understanding.

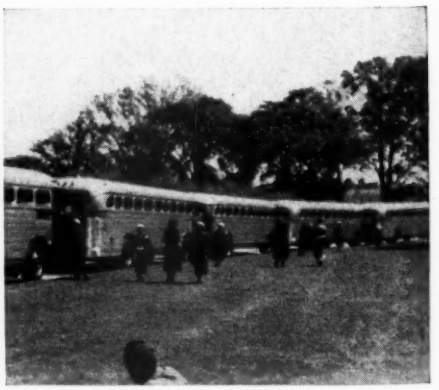
The Founders' Fund, established sixteen years ago as a memorial to Mrs. J. Willis Martin, the first President of the Garden Club of America, is presented each year to the most deserving project proposed by one of the member clubs. The award to The New York Botanical Garden's plant expedition, which will be undertaken this summer by T. H. Everett, Horticulturist, was sponsored by the Lenox Garden Club of Massachusetts and seconded by the Millbrook Garden Club of New York. Mr. Everett will seek different plants that are not already known to American gardeners. The plants may be unusual species, new varieties or forms, but in each case Mr. Everett will carefully evaluate the particular plant for its adaptability to American gardening conditions.

Dedication of the T. A. Havemeyer Memorial Plaque. "As I was traveling to the Garden this morning, I was thinking how many memorials of one kind or another there are to war heroes, how few to peace and to men interested in peaceful pursuits." These were the words with which John C. Wister, Director of the Arthur Hoyt Scott Horticultural Foundation at Swarthmore College, opened his remarks at the dedication of the T. A. Havemeyer Memorial plaque. "Horticulture or gardening, as you may wish to call it," continued Mr. Wister, "is one of the greatest arts of peace, and it is fitting that we are dedicating this memorial to Theodore A. Havemeyer who did so much to advance horticulture in this country."

Mr. Wister related incidents in Mr. Havemeyer's life — it had been Mr. Wister's pleasure to know Mr. Havemeyer intimately for more than thirty years — and told of his contributions to American horticulture, particularly in the field of lilacs. Mr. Havemeyer became interested in lilacs through the late Professor Sargent of the Arnold Arboretum, then went to France and brought back Lemoine hybrids of which he gradually accumulated a large collection of the finest varieties.

Mr. Havemeyer raised many seedlings but, unfortunately, left no record of their parentage. Only one was placed on the market during his lifetime; this was Mrs. W. E. Marshall, named in honor of the wife of his lily friend. It is considered today one of the finest red-purple single lilacs. Subsequently, other lilac seedings raised by Mr. Havemeyer were distributed.

The dedication took place in the lilac



The buses are getting ready to leave the Mrs. Flagler Matthews' estate at Rye, N. Y., for the next stop on the Garden Tour.

The rose garden of The New York Botanical Garden is visited on Rose-Growers' Day and all summer by many thousands of rose lovers.

Mr. Charles B. Harding, President, and Dr. William J. Robbins, Director of The New York Botanical Garden, with Mr. John C. Wister, Director of the Arthur Hoyt Scott Horticultural Foundation, between them, at the dedication of the Havemeyer plaque in the lilac plantation.

plantation adjacent to the rose garden. Charles B. Harding, President of The New York Botanical Garden, stated that five hundred plants in one hundred and sixty varieties had been given by Mrs. Havemeyer as a memorial to her husband and the gift was just another example of the many wonderful things public-spirited people do for the Garden.

The dedication was part of the program of the Tenth Annual Rose-Growers's Day. Visitors, who had enjoyed the early morning hours in the rose garden, assembled at 11:30 o'clock to witness the exercises, when Dr. William J. Robbins, Director, introduced Mr. Wister.

Rose-Growers' Day. The enthusiasm with which visitors surged forward to the platform of the lecture hall in the Museum Building at the close of the day's program, was lively testimony of the success of the Tenth Annual Rose-Growers' Day at The New York Botanical Garden.

In the morning, in spite of a threatening sky, a number of visitors toured the garden under the guidance of T. H. Everett and his committee of guest hosts: Dorothea Bobbink (Mrs. George C.) White, Vice-President of Bobbink & Atkins, Rutherford, N.J.; Dr. Raymond C. Allen, Executive Secretary of the American Rose Society and Editor of AMERICAN ROSE ANNUAL; Paul Frese, Editor of "Popular Gardening"; Patrick J. McKenna, Garden Consultant and Staff Horticulturist of "Flower Grower"; Everett A. Piester, Assistant Superintendent of Parks, Hartford, Conn., in charge of the Hartford Rose Garden.

In the afternoon, Dr. William J. Robbins, Director, greeted the gathering of several hundred rosarians in the lecture hall of the Museum Building and introduced Edwin De T. Bechtel. Mr. Bechtel's sincere enthusiasm and his scholarly presentation of the subject, "Rose Varieties," were appreciated by an attentive audience. Mr. Bechtel's talk is printed on pages 117-118 of this issue.

Mr. Everett served as moderator during the period when rose growers, professional and amateur, plied the panel of experts with many questions, and when Mr. Allen, Mr. Piester, Mr. Frese and F. F. Rockwell, Editor-in-Chief of "The Home Garden," gave a demonstration on how to judge a rose and how to prepare a rose for the exhibition table.

As June 5 marked the tenth anniversary of Rose-Growers' Day, a special feature was added to the program — an invitation class in artistic arrangements featuring roses. Distinctive arrangements were made by Mrs. Dwight Beebe, Englewood, N.J.; Mrs. Angel Diaz, Tenafly, N.J.; Mrs. Milton A. Hescock and Mrs. Robert R. Kearfott, both of Mamaroneck, N.Y.; Mrs. Samuel Leib, Darien, Conn.; Mrs. Matthew T. Mellon, Greenwich, Conn.; Mrs. Robert Naumberg, West Englewood, N.J.; Mrs. F. F. Rockwell, West Nyack, N.Y.; Mrs. William Stickles, Malba, L.I.; Mrs. Laurance Wilson, South Orange, N.J.

Graduation Exercises at The New York Botanical Garden. Eight students received certificates upon completion of the Two-Year Practical Course in Gardening and one student a certificate upon completion of the Two-Year Science Course. (Others participated in the courses as "refreshers," but were not interested in obtaining a certificate, which is optional.) The graduation exercises were held at The New York Botanical Garden on Thursday evening, June 19. The exercises were conducted by G. L. Wittrock, Assistant Curator of Education. Mr. Wittrock presented the graduates to Dr. William J. Robbins, Director, who gave certificates to the following in the Practical Gardening Course: Edna Frances Blair, Paterson, N. J.; Jessie I. De Blaker, Paterson, N. J.; Cecile Imshaug, Kew Garden Hills, L. I.; George W. Patridge, West Nyack, N. Y.; Ruth L. Satter, Tuckahoe, N. Y.; Albert Seadon, Jerico, L. I.; Orville M. Steward, Bronx, N. Y., and Harry Wurster, Jamaica, L. I., and to Howard L. Campion, Queens Village, L. I., in the Science Course.

Dorothy Ebel Hansell, editor of THE GARDEN JOURNAL, was the speaker of the evening. Mrs. Hansell chose as the title of her talk, "How Will You Rock Garden?" and gave pointers on rock gardening, based on her personal experiences as an amateur gardener.

The increaseing numbers of enthusiastic riders on the tractor train, made possible by the generosity of Mrs. Harold I. Pratt, will soon result in lively competition with the New York Central Railroad.

The Corporation of The New York Botanical Garden

The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are: Mrs. Hermann G. Place, Chairman; Mrs. James C. MacKenzie, First Vice-Chairman; Mrs. Guthrie Shaw, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Richard Fenby Bausman, Corresponding Secretary; and Mrs. John E. Parsons, Treasurer.

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Mrs. Arthur M. Anderson
Mrs. Montgomery B. Angell
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Mrs. Edward G. Sparrow
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Mrs. Henry Steeger
Edgar B. Stern
Chauncey Stillman
Mrs. Byron Stookey
Mrs. Donald B. Straus
Nathan Straus
Mrs. Paul Sturtevant
Mrs. Arthur H. Sulzberger
Joseph R. Swan
Mrs. Joseph R. Swan
Mrs. Thomas D. Thacher
Oakleigh L. Thorne
John C. Traphagen
Prof. Sam F. Trelease
Arthur S. Vernay
Mrs. Antonie P. Voislawsky
Manfred Wahl
Allen Wardwell
R. Gordon Wasson
Mrs. Thomas J. Watson
Mrs. Charles D. Webster
Mrs. Philip B. Weld
Nelson M. Wells
Mrs. Wallace S. Whittaker
Mrs. Andrew Murray Williams
Mrs. Nelson B. Williams
John C. Wister
Richardson Wright

from the HERB SHELF

SORREL SOUP (Creme d'Oseille)

½ lb. carefully picked sorrel
1 large head lettuce
4 sprigs tarragon
a little chervil
2 oz. butter
1½ pt. chicken stock
½ cup cream
4 egg yolks
½ pt. Bechamel sauce*

Wash sorrel and lettuce, cut up small, and put in saucepan with butter. Stir while cooking (about three minutes), then add stock. Let simmer about thirty minutes, then put through fine sieve. Place in clean saucepan with Bechamel sauce, season with salt and pepper and a grate of nutmeg, if desired. Reheat, add chopped tarragon and chervil, and cook a few minutes more. Pour hot liquid over whisked-up egg yolks and cream and stir over fire a few minutes to cook eggs. Serves four.

*BECHAMEL SAUCE
1½ oz. flour
2 oz. butter
1¼ pt. milk or white stock
1 small onion or shallot
1 small bouquet-garni (parsley, thyme, bay leaf)
10 peppercorns
½ bay leaf
1 blade mace
nutmeg
½ pinch cayenne
½ tsp. salt

Boil milk with onion or shallot, bouquet-garni, peppercorns, bayleaf and mace. Melt butter, stir in flour and cook a little without browning. Stir in hot milk, etc., whisk over fire until it boils. Then, let simmer for fifteen minutes. Pass through sieve, season lightly with nutmeg, cayenne and salt.

NOREEN SHERIDAN CAPEN

Garden sorrel *(Rumex Acetosa)* is best grown from seed in a damp location. This herb has a characteristic acid taste by the time it flowers. Its flowers are deep purple and its leaves are rusty-red in late summer. The flowering stalks should be cut down; then a new growth of young basal leaves will appear. It is the young leaves that are used for culinary purposes.

Consider a plant — its life — how a seed faln to ground
sucketh in moisture for its germinating cells,
and as it sucketh swelleth, til it burst its case
and thrusting its roots downward and spreading them wide
taketh tenure of the soil, and from every raindrop
on its dribbling passage to replenish the springs
plundereth the freighted salt, while it prickeeth upright
with its flagstaff o'erhead for a place in the sun
anon to disengage buds that in tender leaves
unfolding may inhale provender of the ambient air.

—ROBERT BRIDGES

Wayside Gardens

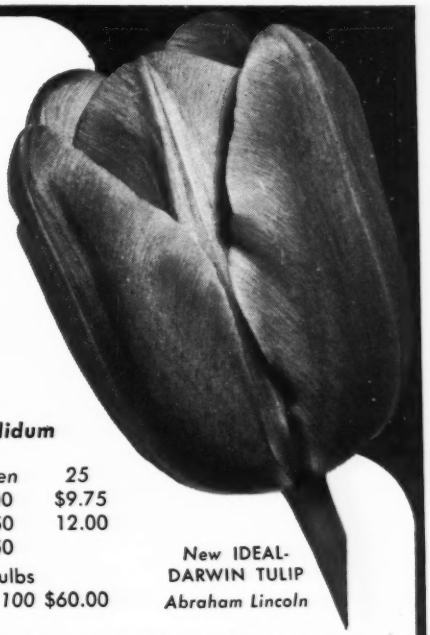
THE WORLD'S

LARGEST SELECTION

OF

TULIPS, DAFFODILS and OTHER BULBS

for AUTUMN PLANTING



New IDEAL-DARWIN TULIP
Abraham Lincoln

MADONNA LILIES, *Lilium Candidum*

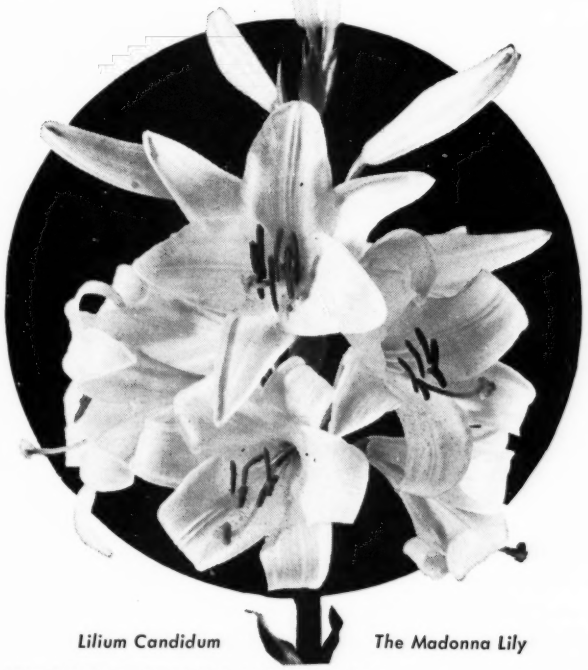
The glistening white flowers, exquisite fragrance and sheer beauty of the unbelievably lovely Madonna Lily have endeared it to people the world over. It is one of the most beautiful and popular of all white lilies to grace the garden. Heavy clusters of pure, pristine white, trumpet-like blooms are borne 3½ to 4 ft. high on strong attractive stalks. Easy to grow in any sunny, well drained location.

MADONNA LILIES, *Lilium Candidum*

Imported French Bulbs

Bulb Size		Three	Dozen	25
Top Size	22,24cm	$1.40	$5.00	$9.75
Mammoth	24,26cm	1.80	6.50	12.00
Giants	26,28cm	2.00	7.50	

"Cascade Strain", American Bulbs
Three $2.25; Dozen $8.00; 25 15.50; 100 $60.00



Lilium Candidum — *The Madonna Lily*

SUPERIOR WAYSIDE TULIPS

The little girl is so right, she is looking in amazement at a huge tulip that must have been grown from Wayside Gardens' stock. It is one of the enormous long stemmed beauties gardeners all over America expect from Wayside.

Wayside is constantly on the alert for new and better varieties to offer its gardening friends. Many of the exclusive new introductions will not be generally available for many years to come.

"LOOK MOMMY, THEY'RE AS BIG AS ME"

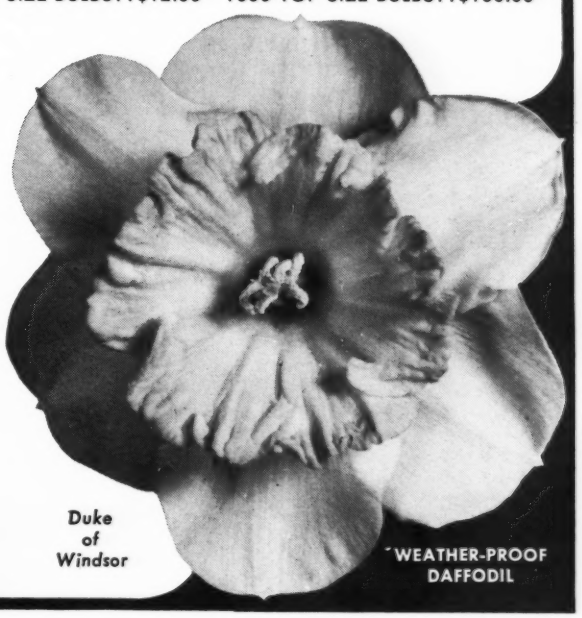
WAYSIDE'S "1952 TULIP MIXTURE"

Each year, we arrange with Grullemans of Holland to set aside several thousand choice, top size bulbs for this outstanding annual offer. From the hundreds of varieties of Cottage, Darwin, Ideal Darwin, Giant Breeder, Multi-flowered, Lily-flowered and Chameleon Tulips, only the finest, superior bulbs are selected. This popular mixture includes the most graceful shapes and forms in a harmonious blending of colors.

WAYSIDE GARDENS' TULIP MIXTURE

50 TOP SIZE BULBS..$ 6.50 — 250 TOP SIZE BULBS..$ 28.00
100 TOP SIZE BULBS..$12.00 — 1000 TOP SIZE BULBS..$100.00

WEATHER-PROOF DAFFODILS are the sensational, hardy, new varieties that will soon be top favorites in every garden in America. Enormous flowers have gleaming white petals with deeply ruffled and wide flaring cups of soft yellow to deep gold. First introduced by Wayside, they are the finest daffodils ever created. Rain, snow, wind or burning sun will not harm them. Multiply rapidly, soon filling your garden with springtime glory. *1 each of 10 selected varieties* (10 bulbs) $4.00



Duke of Windsor

WEATHER-PROOF DAFFODIL

SEND FOR THE WORLD'S FINEST HORTICULTURAL BOOK-CATALOG

Wayside's new fall catalog is a "must" for every garden lover. Almost 150 pages, filled with hundreds of glorious true-color illustrations of the world's newest and best roses, shrubs, bulbs and "pedigreed" hardy plants. Complete cultural directions for every item. Not just a catalog, but a valuable reference book. To be sure you get your copy, it is necessary that you enclose with your request 50¢, coin or stamps, to cover postage and handling costs.

51 MENTOR AVE.
MENTOR, OHIO

Wayside Gardens

Clivias are among the many fascinating plants that are natives of South Africa. In California, where the climate is congenial, clivias are grown outdoors; where Nature is less kind, they are cultivated in pots and tubs for use indoors and on terraces.

From a decorative point of view, hybrids are decided improvements over the species. One of the most interesting of these, because of its attractive yellow flowers, appeared at Kew thirty years ago and was named *Clivia kewensis*.

Lord Aberconway, President of the Royal Horticultural Society and a good friend of The New York Botanical Garden, interested himself in the hybridization of clivias and from C. *kewensis* produced a superior yellow-flowered form named "Bodnant Yellow." We are indebted to Lord Aberconway for the plant of "Bodnant Yellow," which he sent to The New York Botanical Garden three years ago and which bloomed for the first time here this spring.

T. H. Everett